

Rubin & Hays

ATTORNEYS AT LAW

Kentucky Home Trust Building, 450 South Third Street, Louisville, Kentucky 40202-1410
Telephone (502) 569-7525 Telefax (502) 569-7555 Email: rh@rubinhays.com

CHARLES S. MUSSON
W. RANDALL JONES
CHRISTIAN L. JUCKETT

PARALEGAL
MARY M. EMBRY

February 6, 2006

Ms. Elizabeth O'Donnell
Executive Director
Public Service Commission
P.O. Box 615
Frankfort, Kentucky 40602

RECEIVED
FEB 8 2006
PUBLIC SERVICE
COMMISSION

Case 2006-00053

Re: Bracken County Water District - Kentucky Public Service Commission Application
for a CPCN for a Water System Improvements Project

Dear Ms. O'Donnell:

Enclosed please find the original and ten (10) copies of the Application of the Bracken County Water District for a Certificate of Public Convenience and Necessity to construct a water system improvements project pursuant to KRS Chapter 278.

Also enclosed are eleven (11) copies of the exhibits required, with the exception of the Plans and Specifications, prepared by HMB Engineers, Inc., on the Project, two of which are being forwarded by said Engineers.

If you need any additional information or documentation, please let us know.

Sincerely,

Rubin & Hays

By


W. Randall Jones

WRJ:jlm
Enclosures

cc: Ms. Diana Moran, BCWD

RECEIVED

FEB 8 2006

PUBLIC SERVICE
COMMISSION

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the matter of:

APPLICATION OF THE BRACKEN COUNTY)
WATER DISTRICT FOR A CERTIFICATE)
OF PUBLIC CONVENIENCE AND NECESSITY)
TO CONSTRUCT AN IMPROVEMENTS PROJECT)
PURSUANT TO KRS 278.020)

Case No. 2006-00053

APPLICATION

The Bracken County Water District (the "District"), by counsel, pursuant to KRS 278.020, petitions the Commission for a certificate of public convenience and necessity to construct a waterworks improvement project. The following information is filed in accordance with the Commission's regulations:

1. The District's office address is P.O. Box 201, Brooksville, Kentucky 41004. Its principal officers are listed in its 2005 Annual Report, which is on file with the Commission;
2. The District is a non-profit water district organized under KRS Chapter 74 and has no separate articles of incorporation or by-laws;
3. A description of the District's water system and its property stated at original cost by accounts is contained in its Annual Report, which is incorporated by reference pursuant to 807 KAR 5:001 Section (5)(5). All required normal financial schedules and other data are in the Annual Report;
4. The Delisle Curve water improvements project is described in detail in **Exhibit "A"** attached hereto, with the exception of the office building which will be constructed at a later date;
5. The total project cost is approximately \$3,100,000, as set forth in the Final Project Budget attached hereto as **Exhibit "B"**;

6. The District has obtained all easements are required for the Project;

7. This service will not compete with any other utility in the area;

8. Based on these facts, the District believes that it is in the public interest that this certificate of public convenience and necessity be granted;

9. Copies of the certified bid tabulations are attached hereto as **Exhibit "C"**;

10. The following information is provided in response to 807 KAR 5:001 Section (8)(3);

a. Articles of Incorporation - None, District is a statutorily created water district under KRS Chapter 74;

11. The following information is supplied to 807 KAR 5:001 Section (9)(2);

a. Facts relied upon to show that the Project is in the public interest: See **Exhibit "A"** attached hereto;

b. No new franchises are required. The District has acquired a site for the tank.

A copy of the recorded Deed is attached hereto as **Exhibit "D"**;

c. Copies of the necessary permits are attached hereto as **Exhibit "E"**.

Diagrams of the proposed construction and construction specifications are contained in the Plans and Specifications on file with the Commission;

d. Three (3) maps of suitable scale showing location of the proposed facilities are filed with this Application;

e. The construction costs will be funded by (i) connection fees in the amount of \$45,000; (ii) a KIA Tobacco Fund grant in the amount of \$265,000; and (iii) an interim loan from the Kentucky Rural Water Finance Corporation in the principal amount of \$2,790,000, such loan to mature on August 1, 2007.

f. The estimated cost of operation of the system after construction is completed is attached hereto as **Exhibit "F"**;

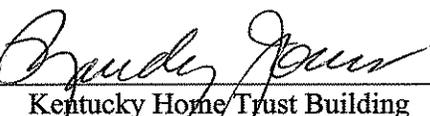
12. The District is in the process of having a general rate case prepared and such case should be filed in the near future. Such rate increase is being requested and is a result of the Delisle Curve water project. Accordingly, the certificate of public convenience and necessity exemption set out in House Bill 267 does not apply in this case.

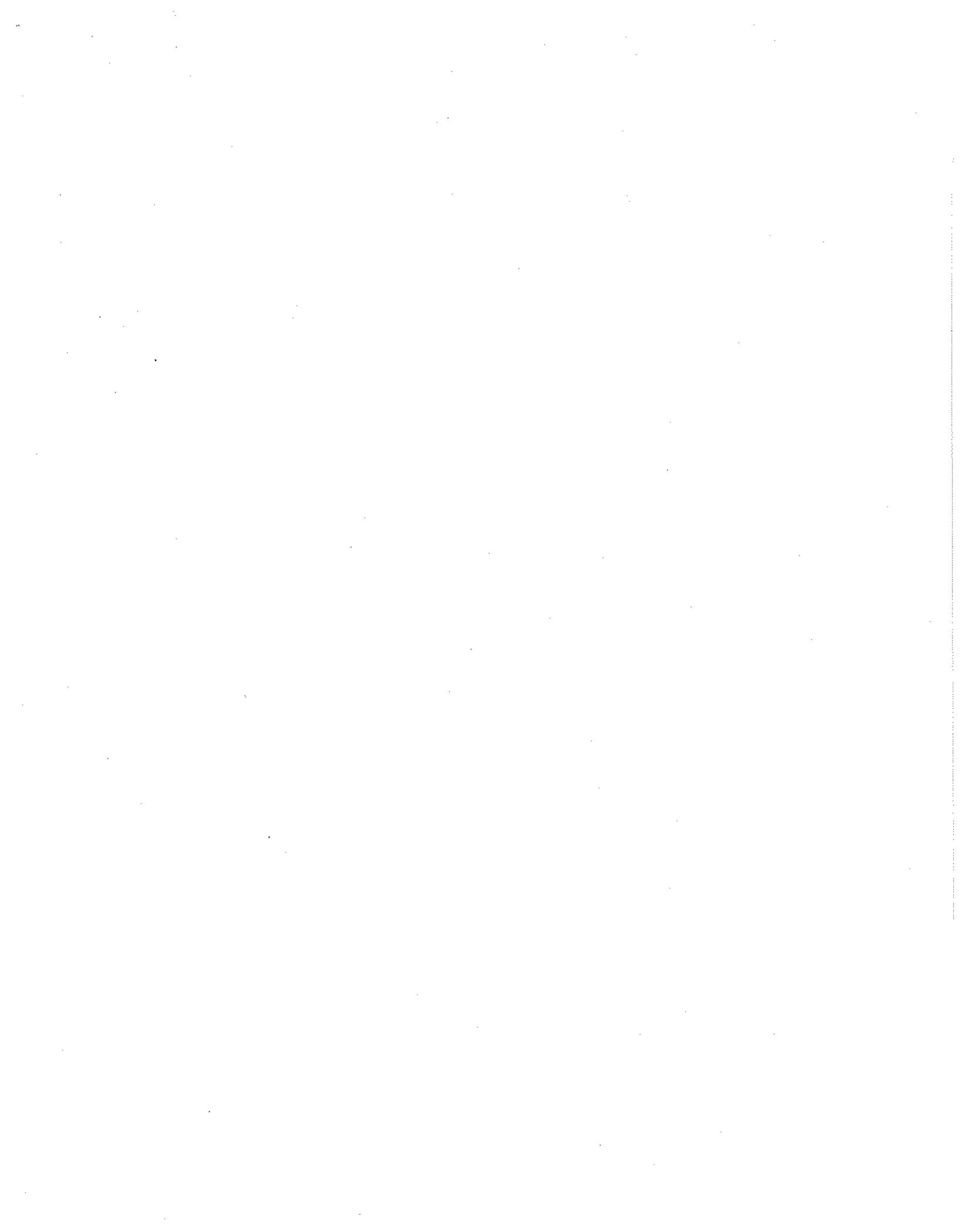
WHEREFORE, the Applicant, Bracken County Water District requests that the Public Service Commission of Kentucky grant to the Applicant a Certificate of Public Convenience and Necessity permitting the Applicant to construct the Delisle Curve water improvement project.

Bracken County Water District

By 
Chairman

Rubin & Hays

By 
Kentucky Home Trust Building
450 South Third Street
Louisville, Kentucky 40202
(502) 569-7525



Bracken County Water District Delisle Curve Water Project

Need For Project

The Bracken County Water District (BCWD) proposes to improve water service to its existing customers and extend water service to rural areas Bracken County with the construction of the Delisle Curve Water Project. The Delisle Curve Water Project consists of approximately 27 miles of water line, a 300,000 gallon elevated tank, a booster pump station and an office/storage building. Currently, many residents of rural Bracken County rely on wells or cisterns for their water. This is not only inconvenient, but also raises concerns of health issues. This project will provide water service to approximately 75 potential customers. It will also improve service to the existing customers and the City of Brooksville by increasing the water pressure. This will be accomplished by upgrading existing water lines and the construction of the new elevated water storage tank.

The Delisle Curve Water Project does not compete with any surrounding utilities and is consistent with the water management plan approved by the Buffalo Trace Area Development District.

**DELISLE CURVE WATER PROJECT
FINAL PROJECT BUDGET**

Project Costs

CONSTRUCTION COSTS		\$2,287,365
Contract VII - Water Line	\$1,763,865	
Contract VIII - Tank	\$523,500	
ENGINEERING		
PRELIMINARY ENGINEERING		\$5,000
DESIGN		\$172,200
INSPECTION		\$101,300
LEGAL & ADMINISTRATION		\$50,000
LAND & RIGHTS		\$160,000
INTEREST DURING CONSTRUCTION		\$10,000
CONTINGENCIES		\$200,000
ARCHAEOLOGICAL SURVEY		\$2,770
PSC		\$2,000
GEOTECH. INVESTIGATION		<u>\$7,700</u>

TOTAL ESTIMATED PROJECT COST		\$2,998,335
	USE	\$3,000,000

Cost to Complete South Western Project		\$100,000
--	--	-----------

Total Amount of Funds Required		\$3,100,000
--------------------------------	--	--------------------

Project Funding

TAP FEES (1)		\$45,000
KIA TOBACCO GRANT		\$265,000
KRWA LOAN		\$2,790,000
 TOTAL FUNDING		 \$3,100,000

(1) Tap Fees = 75 cust. @\$600 each.

Big Tabulation
 Contract VII
 Brecken County Water District
 Delsie Curve Water Project
 Bid Date: January 18, 2006

ITEM	QUANTITY	UNITS	Tilcon Excavating, LLC		G & W Construction Co., Inc.		Howell Contractors, Inc.		RE Huber Construction Inc.		BEP Pipeline, L.L.C.		Lybels Contracting, Inc.		City Pipeline, Inc.		Eaton Asphalt Paving Co. Inc		Kenny, Inc.			
			UNIT PRICE	TOTAL	UNIT PRICE	TOTAL	UNIT PRICE	TOTAL	UNIT PRICE	TOTAL	UNIT PRICE	TOTAL	UNIT PRICE	TOTAL	UNIT PRICE	TOTAL	UNIT PRICE	TOTAL	UNIT PRICE	TOTAL		
1	600	L.F.	\$12.00	\$7,200.00	\$12.00	\$7,200.00	\$12.00	\$7,200.00	\$44.78	\$26,688.00	\$15.00	\$9,000.00	\$15.00	\$9,000.00	\$14.90	\$8,940.00	\$16.25	\$9,750.00	\$17.55	\$10,530.00		
2	64,000	L.F.	\$9.90	\$633,600.00	\$10.40	\$665,600.00	\$11.00	\$704,000.00	\$10.88	\$696,320.00	\$12.25	\$784,000.00	\$11.15	\$713,600.00	\$13.90	\$891,600.00	\$12.35	\$790,400.00	\$18.70	\$1,204,800.00		
3	8,600	L.F.	\$13.20	\$113,520.00	\$13.36	\$114,816.00	\$13.75	\$118,200.00	\$15.65	\$134,580.00	\$16.00	\$137,600.00	\$20.50	\$176,300.00	\$14.50	\$124,700.00	\$18.85	\$163,100.00	\$19.15	\$164,680.00		
4	14,400	L.F.	\$9.00	\$129,600.00	\$9.84	\$141,696.00	\$10.75	\$154,800.00	\$10.97	\$157,968.00	\$13.00	\$188,400.00	\$10.50	\$151,200.00	\$11.25	\$162,000.00	\$12.60	\$181,440.00	\$13.30	\$191,520.00		
5	11,000	L.F.	\$7.50	\$82,500.00	\$8.58	\$94,380.00	\$9.75	\$107,250.00	\$9.48	\$104,280.00	\$9.75	\$107,250.00	\$9.30	\$102,300.00	\$9.90	\$108,900.00	\$11.40	\$125,400.00	\$11.85	\$130,350.00		
6	5,200	L.F.	\$6.60	\$34,320.00	\$7.64	\$39,728.00	\$7.90	\$41,080.00	\$8.25	\$42,900.00	\$9.90	\$51,480.00	\$8.15	\$44,580.00	\$9.00	\$58,800.00	\$10.20	\$53,040.00	\$10.80	\$56,160.00		
7	3,700	L.F.	\$14.00	\$51,800.00	\$14.43	\$53,391.00	\$14.75	\$54,525.00	\$15.52	\$57,424.00	\$16.00	\$59,200.00	\$16.10	\$59,570.00	\$15.90	\$58,230.00	\$20.00	\$74,000.00	\$20.35	\$75,285.00		
8	3,700	L.F.	\$6.00	\$22,200.00	\$6.75	\$24,975.00	\$6.25	\$23,125.00	\$8.28	\$30,636.00	\$7.20	\$26,760.00	\$7.75	\$28,675.00	\$6.45	\$23,855.00	\$9.20	\$34,040.00	\$8.00	\$29,600.00		
9	4,700	L.F.	\$5.00	\$23,500.00	\$5.89	\$27,663.00	\$5.75	\$27,025.00	\$5.94	\$27,918.00	\$6.50	\$30,550.00	\$6.95	\$32,665.00	\$5.50	\$23,850.00	\$8.40	\$39,480.00	\$8.00	\$37,600.00		
10	27,800	L.F.	\$4.65	\$128,270.00	\$5.48	\$152,344.00	\$5.25	\$145,950.00	\$5.77	\$160,405.00	\$6.25	\$173,750.00	\$6.30	\$175,140.00	\$6.15	\$170,870.00	\$6.15	\$170,870.00	\$7.60	\$211,260.00		
11	60	L.F.	\$4.00	\$240.00	\$4.31	\$258.60	\$5.75	\$345.00	\$5.50	\$330.00	\$6.00	\$360.00	\$18.10	\$1,086.00	\$2.50	\$150.00	\$16.00	\$960.00	\$8.20	\$492.00		
12	420	L.F.	\$60.00	\$25,200.00	\$60.97	\$25,608.60	\$60.00	\$25,200.00	\$60.00	\$25,200.00	\$60.00	\$25,200.00	\$126.40	\$53,088.00	\$125.00	\$52,500.00	\$125.00	\$52,500.00	\$125.00	\$52,500.00	\$144.50	\$60,890.00
13	675	L.F.	\$70.00	\$47,250.00	\$76.96	\$51,966.00	\$67.00	\$45,165.00	\$65.00	\$43,950.00	\$65.00	\$43,950.00	\$109.45	\$73,875.75	\$117.00	\$78,825.00	\$88.00	\$59,640.00	\$88.00	\$59,640.00	\$142.50	\$96,165.00
14	230	L.F.	\$65.00	\$14,950.00	\$72.95	\$16,778.50	\$65.00	\$14,950.00	\$75.00	\$17,250.00	\$75.00	\$17,250.00	\$16.00	\$3,600.00	\$9.50	\$2,175.00	\$88.00	\$20,240.00	\$77.00	\$17,665.00	\$100.00	\$23,000.00

ITEM	QUANTITY	UNITS	UNIT PRICE	TOTAL																
18" Type 'B' Creek Crossing including Filings, Concrete Casing, Casing Pipe, Complete in Place as shown on the detail	25	L.F.	\$65.00	\$1,625.00	\$68.30	\$2,232.50	\$55.00	\$1,375.00	\$60.00	\$1,500.00	\$40.00	\$1,000.00	\$235.00	\$5,875.00	\$25.00	\$625.00	\$440.00	\$11,000.00	\$80.20	\$2,005.00
18" Type 'B' Creek Crossing including Filings, Concrete Casing, Casing Pipe, Complete in Place as shown on the detail	120	L.F.	\$65.00	\$7,800.00	\$72.27	\$8,672.40	\$53.00	\$6,360.00	\$50.00	\$6,000.00	\$30.00	\$3,600.00	\$140.00	\$16,800.00	\$25.00	\$3,000.00	\$220.00	\$26,400.00	\$75.20	\$9,024.00
18" Type 'B' Creek Crossing including Filings, Concrete Casing, Casing Pipe, Complete in Place as shown on the detail	25	L.F.	\$65.00	\$1,625.00	\$68.15	\$1,703.75	\$51.00	\$1,275.00	\$30.00	\$750.00	\$20.00	\$500.00	\$235.00	\$5,875.00	\$25.00	\$625.00	\$315.00	\$7,875.00	\$62.70	\$1,567.50
3 Nozzle Fire Hydrant Assembly, including Tee, Valve, Valve Box, Mechanical Joint Anchoring, Pipe and Filings, Complete in Place	22	EA.	\$2,250.00	\$49,500.00	\$2,247.64	\$49,448.08	\$1,100.00	\$24,200.00	\$2,400.00	\$52,800.00	\$2,000.00	\$44,000.00	\$2,280.00	\$50,160.00	\$2,800.00	\$61,600.00	\$2,725.00	\$59,950.00	\$2,700.00	\$59,400.00
Single Nozzle Blowoff Hydrant Assembly, including Tee, Valve, Valve Box, Mechanical Joint Anchoring, Pipe and Filings, Complete in Place	14	EA.	\$1,000.00	\$14,000.00	\$1,074.40	\$14,941.60	\$1,100.00	\$15,400.00	\$1,125.00	\$15,750.00	\$1,200.00	\$16,800.00	\$1,180.00	\$16,520.00	\$2,600.00	\$36,400.00	\$2,800.00	\$39,200.00	\$1,525.00	\$21,350.00
Automatic Air Release Valve Assembly and Box, Complete in Place	19	EA.	\$350.00	\$6,650.00	\$485.21	\$9,218.99	\$375.00	\$7,125.00	\$60.00	\$1,140.00	\$40.00	\$760.00	\$550.00	\$10,450.00	\$1,125.00	\$21,375.00	\$1,700.00	\$32,300.00	\$840.00	\$16,160.00
Crushed Stone on trench, full depth On driveways, roadway crossings and streets	5,000	L.F.	\$4.00	\$20,000.00	\$12.00	\$60,000.00	\$8.50	\$42,500.00	\$7.00	\$35,000.00	\$2.00	\$10,000.00	\$7.60	\$38,000.00	\$10.00	\$50,000.00	\$7.40	\$37,000.00	\$5.15	\$25,750.00
Bituminous Paving Replacement on State maintained roads, streets, and Driveways, including gravel basefill	500	L.F.	\$18.00	\$9,000.00	\$20.00	\$10,000.00	\$16.00	\$8,000.00	\$12.00	\$6,000.00	\$40.00	\$20,000.00	\$22.55	\$11,275.00	\$25.00	\$12,500.00	\$38.00	\$19,000.00	\$12.00	\$6,000.00
Concrete Paving Replacement, 6" Thick, including gravel basefill	200	L.F.	\$18.00	\$3,600.00	\$40.00	\$8,000.00	\$18.00	\$3,600.00	\$20.00	\$4,000.00	\$30.00	\$6,000.00	\$34.45	\$6,890.00	\$50.00	\$10,000.00	\$38.00	\$7,600.00	\$24.75	\$4,950.00
Flowable Fill Concrete, including sand and flowable backfill as shown on detail sheet and described in specs. (Bit. Replacement not included)	2,000	L.F.	\$8.00	\$16,000.00	\$25.00	\$50,000.00	\$13.00	\$26,000.00	\$16.00	\$32,000.00	\$28.00	\$56,000.00	\$22.25	\$44,500.00	\$25.00	\$50,000.00	\$32.00	\$64,000.00	\$18.75	\$37,500.00
Plug Abandoned Water Line All Sizes, including concrete as shown on the plans, complete in place.	25	EA.	\$400.00	\$10,000.00	\$600.00	\$15,000.00	\$150.00	\$3,750.00	\$200.00	\$5,000.00	\$500.00	\$12,500.00	\$1,085.00	\$27,125.00	\$175.00	\$4,375.00	\$87.00	\$2,175.00	\$800.00	\$20,000.00
Master Meter Vault including but not limited to check valve, meters, piping, filling, vault and lid as shown on plans, complete in place	1	LS	\$16,000.00	\$16,000.00	\$15,800.78	\$15,800.78	\$23,000.00	\$23,000.00	\$19,800.00	\$19,800.00	\$10,000.00	\$10,000.00	\$18,500.00	\$18,500.00	\$20,000.00	\$20,000.00	\$20,700.00	\$20,700.00	\$22,100.00	\$22,100.00
Mainline Pressure Reducing Station including but not limited to valves, piping, fillings, vault as shown on plans, complete in place.	3	EA.	\$11,000.00	\$33,000.00	\$11,074.67	\$33,224.01	\$12,000.00	\$36,000.00	\$11,000.00	\$33,000.00	\$9,000.00	\$27,000.00	\$10,700.00	\$32,100.00	\$9,000.00	\$27,000.00	\$12,200.00	\$36,600.00	\$8,650.00	\$25,950.00
Booster Pump Station including but not limited to furnishing and installing 2-300 gpm pumps, air piping, valves, controls, concrete, site work, power pole, etc. (Complete in Place)	1	LS	\$82,000.00	\$82,000.00	\$72,116.00	\$72,116.00	\$81,960.00	\$81,960.00	\$89,000.00	\$89,000.00	\$90,000.00	\$90,000.00	\$70,180.00	\$70,180.00	\$72,000.00	\$72,000.00	\$67,519.00	\$67,519.00	\$81,100.00	\$81,100.00
TOTAL BID PRICE				\$1,938,032.74		\$2,010,850.00		\$2,010,850.00		\$2,081,359.32		\$2,168,300.00		\$2,237,866.25		\$2,240,514.00		\$2,495,100.00		\$2,668,430.00

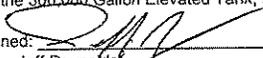
This is to state that the above is an accurate tabulation of bids received on January 16, 2009 by Blackten County Water District for the Denton Creek Water Project

Signed:  Jeff Reynolds
 Kentucky PE No. 20469

Bid Tabulation
 Contract VIII
 Bracken County Water District
 300,000 Gallon Elevated Tank, Delisle Curve Water Project
 Bid Date: January 18, 2006

ITEM	QUANTITY	UNITS	Caldwell Tanks, Inc		Phoenix Fabricators & Erectors, Inc	
			UNIT PRICE	TOTAL	UNIT PRICE	TOTAL
1 300,000 Gallon Elevated Water storage Tank, including tank, tank foundation, valve vault, piping, site preparation, excavation, access road and all appurtenances, as shown on the Plans, and Specifications, complete in place.	1	LS	\$477,500.00	\$477,500.00	\$732,546.00	\$732,546.00
2 Tank Containment During Surface Preparation and Painting, including all material and labor	1	LS	\$46,000.00	\$46,000.00	\$16,700.00	\$16,700.00
TOTAL BID PRICE				\$523,500.00		\$749,246.00

This is to state that the above is an accurate tabulation of bids received on January 18, 2006 by Bracken County Water District for the 300,000 Gallon Elevated Tank, Delisle Curve Water Project

Signed: 
 Jeff Reynolds
 Kentucky PE No. 20469

ENGINEERS PROFESSIONAL
Engineers, Inc. CAS
JAN 17 2006 JOR
4098

BRONSON MOORHEAD, ET. UX.
TO: DEED

D179
P319

BRACKEN COUNTY WATER DISTRICT

This deed, made this 29th day of December, 2005, by and between BRONSON MOORHEAD AND CAROLYN MOORHEAD, his wife, of 1220 Brooksville-Germantown Road, Brooksville, Kentucky 41004, GRANTORS and BRACKEN COUNTY WATER DISTRICT, acting by and through its Chairman, Charles Tarvin, of 103 Woodward Avenue, Brooksville, Kentucky 41004, ✓ P.O. Box 201 GRANTEE, witnesseth:

That for and in consideration of the sum of ONE HUNDRED FIFTY-FOUR THOUSAND SIX HUNDRED SIXTY-TWO AND 00/100 DOLLARS (\$154,662.00) cash in hand paid, the receipt of which is hereby acknowledged, GRANTORS hereby convey to GRANTEE, its successors and assigns, forever, the following described real estate in Bracken County, Kentucky:

Two parcels of land containing 48.579 acres and 2.975 acres, respectively, lying, situate and being in the County of Bracken, Kentucky, and being more completely described on ADDENDUM A, LEGAL DESCRIPTION, which is attached hereto and incorporated herein by reference.

SOURCE OF TITLE: Being a part of the same real estate conveyed to Bronson Moorhead and Rosemary Moorhead, husband and wife, with rights of survivorship, by deed of James Lundrigan, et. ux., dated February 27, 1962, of record at Deed Book 83, Page 247, Bracken County Records. Rosemary Moorhead died, thereby vesting title in Bronson Moorhead, as per the survivorship provisions in deed. Bronson's wife, Carolyn Moorhead, joins herein as Grantor to convey her dower interest in the property.

RESERVATION: Grantors hereby reserve to themselves 3.061 acres, being the remainder of the property from the original deed referenced above, which is attached as ADDENDUM B, RESERVATION.

The 2005 property taxes shall be paid by Grantors. This conveyance is made subject to all restrictions and easements of record.

TO HAVE AND TO HOLD the same, with all the privileges and appurtenances thereto, unto GRANTEE, as above stated, with covenants of general warranty. IN WITNESS WHEREOF, GRANTORS have hereunto set his or her hand on the day and year first above written.

ADD & SCHUMACHER
ATTORNEYS AT LAW
BROOKSVILLE, KENTUCKY
41004

Bronson Moorhead
BRONSON MOORHEAD
GRANTOR

Carolyn Moorhead
CAROLYN MOORHEAD
GRANTOR

STATE OF KENTUCKY)
)
COUNTY OF BRACKEN)

Before me, a duly authorized Notary Public in the State of Kentucky, personally appeared Bronson Moorhead and Carolyn Moorhead, his wife, each of whom acknowledged his/her signature as Grantor herein on this 29th day of December, 2005.

My Commission Expires: 9-3-06

Mary Lou Hickey
Notary Public, State of KY At Large

CONSIDERATION CERTIFICATE

We, Bronson Moorhead and Carolyn Moorhead, Grantors, and Bracken County Water District, acting by and through its Chairman, Charles Tarvin, Grantee, do hereby certify pursuant to KRS Chapter 382 that the consideration stated herein is the true, correct and full consideration paid for the property conveyed herein. We understand that falsification of the stated consideration is a Class D Felony, subject to one to five years imprisonment and fines up to \$10,000.00.

Bronson Moorhead
BRONSON MOORHEAD
GRANTOR

Carolyn Moorhead
CAROLYN MOORHEAD
GRANTOR

BRACKEN COUNTY WATER DISTRICT

Charles Tarvin
BY: CHARLES TARVIN, CHAIRMAN
GRANTEE

STATE OF KENTUCKY)
)
COUNTY OF BRACKEN)

Before me, a duly authorized Notary Public in the State of Kentucky, appeared Bronson Moorhead and Carolyn Moorhead, his wife, each of whom, being first duly sworn, executed the foregoing certificate on this 29th day of December, 2005.

My Commission Expires: 9-6-06

Mary Lou Hickey
Notary Public, State of KY at Large

STATE OF KENTUCKY)
)
COUNTY OF BRACKEN)

Before me, a duly authorized Notary Public in the State of Kentucky, appeared Bracken County Water District, acting by and through Charles Tarvin, its Chairman, who, being first duly sworn, executed the foregoing certificate on this 29th day of December, 2005.

My Commission Expires: 9-6-06

Mary Lou Hickey
Notary Public, State of KY at Large

THIS INSTRUMENT PREPARED BY:

Mark A. Schumacher

Mark A. Schumacher
Rudd & Schumacher
Attorneys at Law
P.O. Box 25
Brooksville, KY 41004
Ph. (606) 735-2950

ADDENDUM A, LEGAL DESCRIPTION

Bronson Moorhead

DB 83, PG 247

Parcel 1:

Being a 48.579 acre parcel of that larger tract of land conveyed to Bronson Moorhead DB 83, PG 247, said property located on the west side of KY Hwy 10 and north of Parine Pike and being south of Brooksville and north of Germantown in Bracken County, Kentucky and being more particularly described as follows:

Beginning at a mag nail found at the existing centerline of Parine Pike, corner to Bronson Moorhead DB 83, PG 247 and corner to Kevin Doyle & Lauren Henry DB 172, PG 206; Thence leaving the existing centerline of Parine Pike along the line of Doyle & Henry S 89-10-27 W 88.69' to an iron pin & cap found (M & M, Inc. 3316 & 3407); Thence S 78-01-44 W 139.77' to an iron pin & cap found; Thence S 76-48-18 W 225.25' to an iron pin & cap found, corner to Doyle & Henry and corner to Herman, Jr. & Jeanie Browning DB 168, PG 413; Thence leaving the line of Doyle & Henry along the line of Browning S 76-48-18 W 203.61' to an iron pin & cap found at base of pear tree, corner to Moorhead and corner to Browning; Thence continuing along the line of Browning S 04-13-41 E 85.65' to an iron pin & cap found at base of pear tree, corner to Browning and corner to Bay Family Trust DB 135, PG 100; Thence leaving the line of Browning along the line of Bay Family Trust S 04-43-51 E 259.42' to an iron pin & cap set (RDH 3264 5/8" Rebar Typical) at 40" Oak, corner to Moorhead, corner to Bay Family Trust and corner to Moorhead Family Trust DB 136, PG 341 Lot 13; Thence leaving the line of Bay Family Trust along the line of Moorhead Family Trust Lot 13 S 77-58-03 W 289.78' to an iron pin & cap found (RDH 3264), corner to Moorhead Family Trust Lot 12 & Lot 13; Thence along the line of Moorhead Family Trust Lot 12 S 77-58-03 W 250.61' to an iron pin & cap found, corner to Moorhead Family Trust Lot 11 & Lot 12; Thence along the line of Moorhead Family Trust Lot 11 S 77-58-03 W 169.14' to an iron pin & cap found, corner to Moorhead Family Trust Lot 10 & Lot 11; Thence along the line of Moorhead Family Trust Lot 10 S 77-58-03 W 166.89' to an iron pin & cap found (M & M, Inc. 3316 & 3407); Thence N 75-40-53 W 338.55' to an iron pin & cap found, corner to Moorhead and corner to Moorhead Family Trust Lot 10 & Lot 14; Thence along the line

page 2

Moorhead - 48.579 acres

of Moorhead Family Trust Lot 14 N 43-08-13 W 824.83' to an iron pin & cap found at base of fence post; Thence N 22-35-51 E 120.12' to an iron pin & cap found, corner to Moorhead, corner to Moorhead Family Trust Lot 14, corner to Edward J. Rudd DB 149, PG 423, PC-1, Slide 64 and corner to Hamer Jett & Kenneth Jett DB 94, PG 621, PB 01, PG 01; Thence leaving the line of Moorhead Family Trust Lot 14 along the line of Jett & Jett N 64-15-31 E 141.78' to a metal fence post; Thence N 84-54-06 E 159.19' to an iron pin & cap set at 14" Walnut; Thence N 74-40-07 E 453.63' to an iron pin & cap set at 4" Tree; Thence N 47-38-26 E 76.96' to an iron pin & cap set at base of fence post; Thence N 42-04-43 E 294.38' to a 24" White Oak; Thence N 52-47-52 E 170.03' to an iron pin & cap set at 4" Honey Locust; Thence N 76-50-15 E 89.58' to an iron pin & cap set at 3" Double Wild Cherry; Thence S 77-47-57 E 160.80' crossing the drain to an iron pin & cap set at 8" Walnut; Thence N 82-32-12 E 130.78' to an iron pin & cap set at base of fence post; Thence N 16-38-54 E 31.72' crossing the drain to an iron pin & cap found at 10" Walnut, corner to Moorhead, corner to Jett & Jett and corner to Bracken County Extension District Public Properties Corporation DB 158, PG 223; Thence leaving the line of Jett & Jett along the line of Bracken County Extension District Public Properties Corporation S 60-20-26 E 132.34' to a 18" Maple found; Thence S 83-00-38 E 131.92' to a 24" Ash found; Thence N 77-06-53 E 74.19' to a 15" Ash found, corner to Moorhead 48.579 acre parcel and 3.061 acre parcel and corner to Bracken County Extension District Public Properties Corporation; Thence leaving the line of Bracken County Extension District Public Properties Corporation along a new division line of Moorhead 3.061 acre parcel S 68-41-12 E 170.64' to an iron pin & cap set; Thence S 82-12-44 E 35.58' to an iron pin & cap set; Thence N 83-38-43 E 291.44' to an iron pin & cap set; Thence S 30-37-57 E 52.31' to an iron pin & cap set; Thence N 57-38-50 E 111.48' to an iron pin & cap set at the west right of way of KY Hwy 10; Thence N 57-39-04 E 19.98' to a mag nail set at the existing centerline of KY Hwy 10, corner to Moorhead 48.579 acre parcel and 3.061 acre parcel; Thence along the

page 3

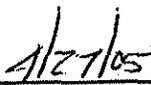
Moorhead - 48.579 acres

existing centerline of KY Hwy 10 S 31-27-29 E 242.78' to a mag nail set at the existing centerline of KY Hwy 10, corner to Moorhead 48.579 acre parcel and 2.975 acre parcel; Thence leaving the existing centerline of KY Hwy 10 along the line Moorhead 2.975 acre parcel S 60-33-51 W 20.00' to an iron pin & cap set at the west right of way of KY Hwy 10; Thence S 60-34-23 W 348.07' to an iron pin & cap set, corner to Moorhead 48.579 acre and 2.975 acre parcels; Thence continuing along the line of Moorhead 2.975 acre parcel S 35-27-11 E 290.00' to an iron pin & cap set at the north right of way of Parine Pike; Thence S 35-27-16 E 20.00' to a mag nail set at the existing centerline of Parine Pike, corner to Moorhead 48.579 acre parcel and 2.975 acre parcel; Thence leaving the line of 2.975 acre parcel along the existing centerline of Parine Pike S 78-03-44 W 53.02'; Thence S 74-19-48 W 29.25'; Thence S 65-51-45 W 26.26' to the point of beginning containing 48.579 acres according to the survey of R. David Hord PLS 3264 of RDH Surveys, Inc., 4/12/2005.

Property subject to all legal right of ways, easements and unrecorded conveyances.

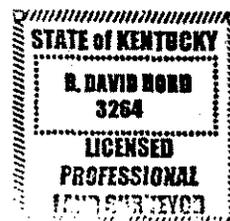
Property subject to any existing right of way for Parine Pike for benefit of the Bracken County Fiscal Court.

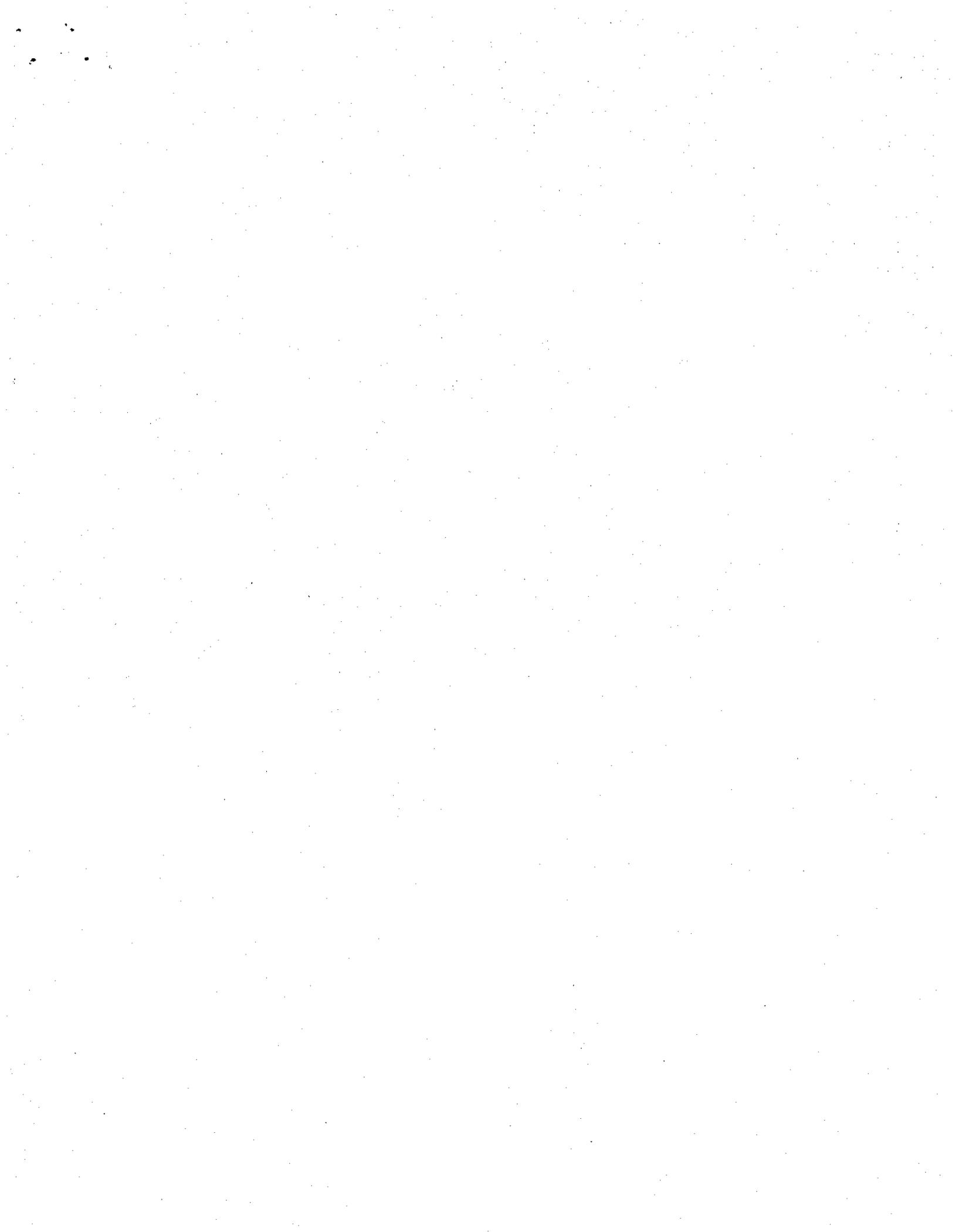
Property subject to existing right of way for KY Hwy 10 for benefit of the Commonwealth of Kentucky, 0.111 acres.

R. David Hord PLS 3264

Date





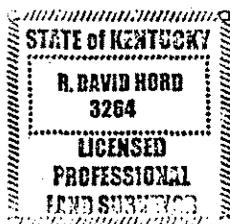
Bronson Moorhead
DB 83 Pg 247

Parcel 2:

Being a 2.975 acre parcel of that larger tract of land conveyed to Bronson Moorhead DB 83 Pg 247 said property located on the west side of KY Hwy. 10 and north side of Parine Pike and being south of Brooksville and north of Germantown in Bracken County, Kentucky and being more particularly described as follows:

Beginning at a mag nail set at the intersection of KY Hwy. 10 and Parine Pike corner to 2.975 acre lot of Moorhead; Thence leaving centerline of KY Hwy. 10 along existing centerline of Parine Pike S 76-11-43 W 160.39'; Thence S 78-13-32 W 183.44'; Thence S 78-04-36 W 25.00' to a mag nail set existing centerline of Parine Pike corner to Moorhead 2.975 acre tract and 48.579 acre tract; Thence leaving existing centerline of Parine Pike with new division line of Moorhead N 35-27-16 W 20.00' to an iron pin and cap set (RDH 3264, 5/8" rebar); Thence N 35-27-11 W 290.00' to an iron pin and cap set new corner to Moorhead 2.975 acre tract and 48.579 acre tract; Thence N 60-34-23 E 348.07' to an iron pin and cap set at assumed right of way of KY 10; Thence N 60-34-20 E 33.51' to a mag nail set centerline of KY 10 corner to Moorhead 2.975 acre tract and 48.579 acre tract; Thence along existing centerline of KY Hwy. 10 S 31-51-22 E 415.00' to the point of beginning containing 2.975 acres according to the survey of R. David Hord PLS 3264 of RDH Surveys Inc. 4/12/05.

- o Property subject to all legal right of ways, easements and unrecorded conveyances.
- o Property subject to 0.188 acre right of way for KY Hwy. 10 for Commonwealth of Kentucky .
- o Property subject to right of way along Parine Pike for benefit of Bracken County Fiscal Court.



R. David Hord 4/12/05
R. David Hord PLS 3264 Date

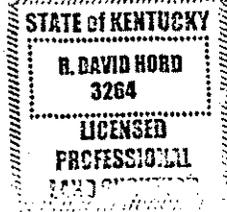
ADDENDUM B, RESERVATION

Bronson Moorhead
DB 83 Pg 247

Being a 3.061 acre parcel of that larger tract of land conveyed to Bronson Moorhead DB 83 Pg 247 said property located on the west side of KY Hwy. 10 south of Brooksville and north of Germantown 650' +/- north of Parine Pike in Bracken County, Kentucky and being more particularly described as follows:

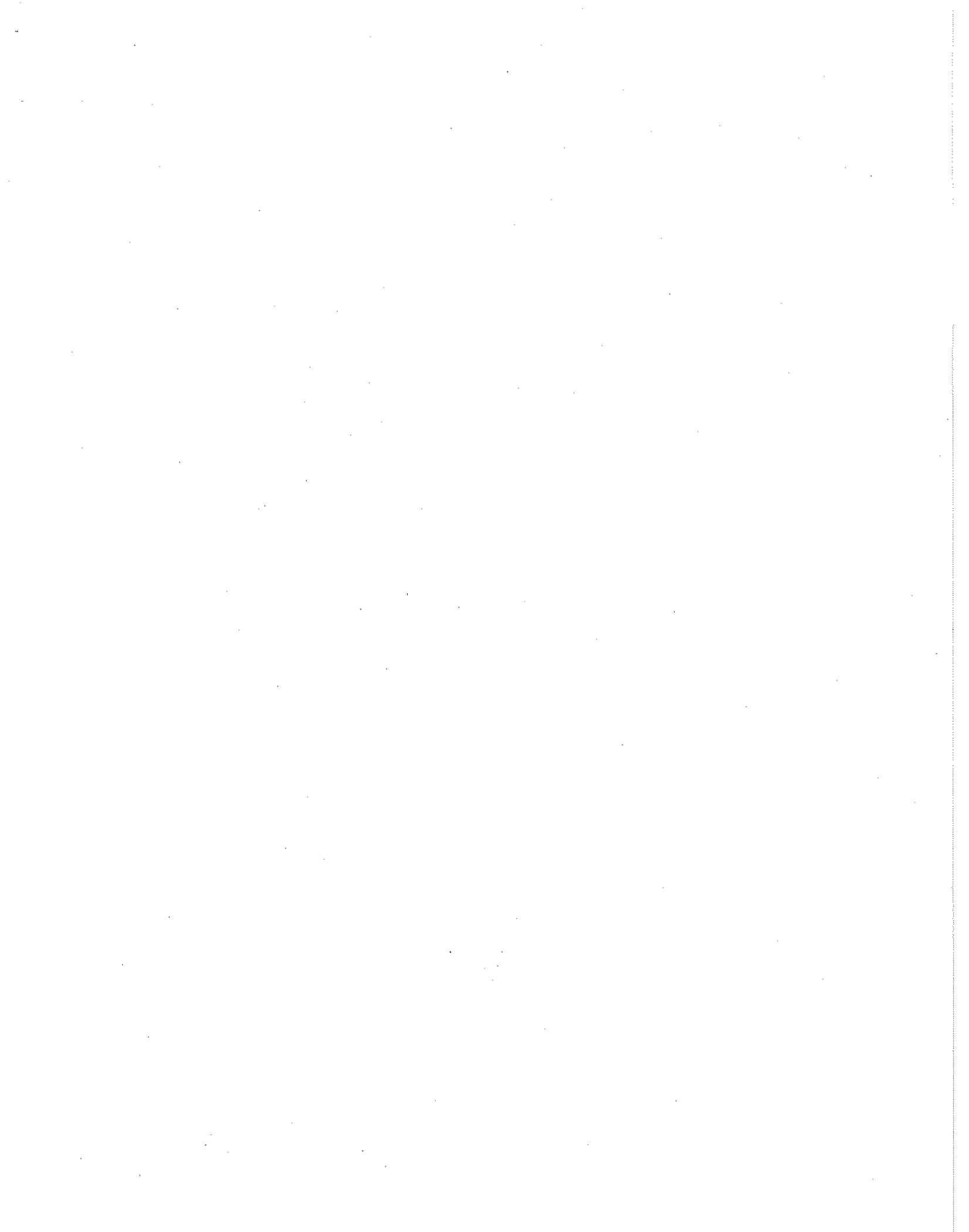
Beginning at a mag nail found at the existing centerline of KY Hwy. 10 corner to Bracken County Extension District Public Properties Corp. DB 158 Pg 223 and corner to Moorhead 3.061 acre lot; Thence along existing centerline of KY Hwy. 10 S 38-23-24 E 148.66'; Thence S 35-47-21 E 119.38'; Thence S 33-13-29 E 149.67' to a mag nail set new corner to Moorhead 3.061 acre tract and 48.579 acre remaining tract of Moorhead; Thence leaving existing centerline of road with new division line of Moorhead S 57-39-04 W 19.98' to an iron pin and cap set at assumed west right of way of KY Hwy. 10; Thence S 57-38-50 W 111.48' to an iron pin and cap set new corner; Thence N 30-37-57 W 52.31' to an iron pin and cap set new corner to Moorhead; Thence S 83-38-43 W 291.44' to an iron pin and cap set; Thence N 82-12-44 W 35.58' to an iron pin and cap set; Thence N 68-41-12 W 170.64' to a 15" ash found new corner to Moorhead 3.061 acre tract and 48.579 acre remaining tract at the south line of Bracken County Extension Office DB 158 Pg 223; Thence N 53-59-38 E 75.28' to a 10" hickory tree found; Thence N 39-44-00 E 67.61' to a fence post; Thence N 44-54-18 E 76.67' to a fence post; Thence N 48-50-28 E 97.96' to a iron pin and cap found (RDH 3264); Thence N 51-50-43 E 165.00' to an iron pin and cap set at assumed west right of way of KY Hwy. 10; Thence N 51-45-36 E 19.97' to the point of beginning containing 3.061 acres according to the survey of R. David Hord PLS 3264 of RDH Surveys Inc. 4/12/05.

- o Property subject to all legal right of ways, easements and unrecorded conveyances.
- o Property subject to a 0.191 acre right of way for KY Hwy. 10 for benefit of the Commonwealth of Kentucky.



R. David Hord 4/27/05
R. David Hord PLS 3264 Date

Document Lodged in Bracken Co:
Date: 1/3/2006 Time: 1:30 P.M.
Fees Collected: 22-155-
Rae Jean Poe, County Clerk
Rae Jean Poe





ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

Ernie Fletcher
Governor

Division of Water
14 Reilly Road
Frankfort, Kentucky 40601-1190
www.kentucky.gov

Lajuana S. Wilcher
Secretary

October 21, 2005

Mr. Eddie A. Chinn, Supt.
Bracken Co Water District
103 Woodward Ave
PO Box 201
Brooksville, KY 41004

RE: Bracken Co Water District, PWS--33805
DW #0120039-05-003
Delisle Curve Water Proj. Contr. VII & VIII
Activity ID # APE20050003
Bracken County, KY

Dear Mr. Chinn :

We have reviewed the plans and specifications for the above referenced project. The plans include the construction of approximately 232,125 feet of 8-inch PVC, 334,000 feet of 6-inch PVC, 32,225 feet of 4-inch PVC and 3,350 feet of 4-inch DI water line. This also includes the construction of a booster pump station operating at 300 GPM @ 95 feet TDH and a 300,000 gallon elevated storage tank. This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of this date with the requirements contained in the enclosed waterline extension construction permit.

If you have any questions regarding this decision, please contact Sarah Tucker at 502/564-2225, extension 482.

Sincerely,

Donna Marlin, Branch Manager
Drinking Water Branch
Division of Water

DSM: SAT

C: Jeff Reynolds, HMB Professional Engineers, Inc.
Bracken County H.D.
Public Service Commission
Division of Plumbing

Distribution-Major Construction

Bracken Co Water District

Subject Item Inventory

Activity ID No.: APE20050003

Subject Item Inventory:

ID	Designation	Description
AIOO33805		
PORT11	Water Line	232,125 feet of 8-inch PVC, 334,000 feet of 6-inch PVC, 32,225 feet of 4-inch PVC, and 3,350 feet of 4-inch DI
PORT12	Booster Pump Station	300 GPM @ 95 ft TDH, 15 HP
STOR1	Elevated Storage Tank	300,000 gallons

Subject Item Groups:

ID	Description	Components
GACT11	232,125 feet of 8-inch PVC, 334,000 feet of 6-inch PVC, 32,225 feet of 4-inch PVC, and 3,350 feet of 4-inch DI; BSP: 300 GPM @ 95 ft TDH, 15 HP; and a 300,000 gallon elevated storage tank	PORT12 300 GPM @ 95 ft TDH, 15 HP
		STOR1 300,000 gallons
		PORT11 232,125 feet of 8-inch PVC, 334,000 feet of 6-inch PVC, 32,225 feet of 4-inch PVC, and 3,350 feet of 4-inch DI

KEY

ACTV = Activity

AREA = Area

EQPT = Equipment

PERS = Personnel

STOR = Storage

AIOO = Agency Interest

COMB = Combustion

MNPT = Monitoring Point

PORT = Transport

STRC = Structure

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 1 of 21

GACT11 (Delisle Curve Water Proj.) 232,125 feet of 8-inch PVC, 334,000 feet of 6-inch PVC, 32,225 feet of 4-inch PVC, and 3,350 feet of 4-inch DI; BSP: 300 GPM @ 95 ft TDH, 15 HP; and a 300,000 gallon elevated storage tank:

Monitoring Requirements:

Condition No.	Parameter	Condition
M-1	Coliform	The presence or absence of total Coliform monitored by sampling and analysis as needed shall be determined for the new or relocated water line(s). Take samples at connection points to existing lines, at 1 mile intervals, and at dead ends without omitting any branch of the new or relocated water line. Sample bottles shall be clearly identified as "special" construction tests. [401 KAR 8:100 Section 1(7), 401 KAR 8:150 Section 4, Recommended Standards for Water Works 8.5.6] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.
M-2	Coliform	The presence or absence of total Coliform monitored by sampling and analysis as needed shall be determined for the new storage structure(s). With at least 1 sample taken at least 24 hours after the first construction complete sample(s), take 2 or more samples from the yard hydrant, the outlet piping from the storage structure, or a sample tap directly connected to the storage structure. Sample bottles shall be clearly identified as "special" construction tests. [Recommended Standards for Water Works 7.0.18, 401 KAR 8:150 Section 4] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.
M-3	Coliform	The presence or absence of total Coliform monitored by sampling and analysis as needed shall be determined for the new pump(s). If the pump(s) are independent of (not directly connected to) the new or relocated lines, take at least 1 sample at the discharge side pitcock. Otherwise, no additional sampling beyond the sampling required for new or relocated lines shall be required in association with the pump(s). Sample bottles shall be clearly identified as "special" construction tests. [401 KAR 8:100 Section 1(7)] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.

Submittal/Action Requirements:

Coliform:

Condition No.	Condition
S-1	Coliform For new construction projects, the distribution system, using the most expedient method, shall submit Coliform test results to the Cabinet: Due immediately following disinfection and flushing. [401 KAR 8:150 Section 4(2)]

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Narrative Requirements:

Condition No.	Condition
---------------	-----------

T-4 During construction, a set of approved plans and specification shall be available at the job site at all times. All work shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 1(7)(a)]

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 5 of 21

Limitation Requirements:

Condition No.	Parameter	Condition
L-8	Distance	<p>Except when not practical, water lines shall be laid a horizontal Distance \geq 10 ft from any existing or proposed sewer. The distance shall be measured edge to edge.</p> <p>In cases where it is not practical to maintain a 10 foot separation, water lines may be installed closer to a sewer provided that the water lines shall be laid in a separate trench or on an undisturbed shelf located on one side of the sewer at such an elevation that the bottom of the water line is at least 18 inches above the top of the sewer. [Recommended Standards for Water Works 8.6.2] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.</p>
L-9	Distance	<p>When water lines and sewers cross,</p> <ol style="list-style-type: none">1) water lines shall be laid such that eithera) the the top of the water line is a vertical Distance \geq 18 in below the bottom of the sewer line orb) the bottom of the water line is a vertical Distance \geq 18 in above the top of the sewer line,2) 1 full length of the water pipe shall be located so that both joints of the water pipe will be as far from the sewer as possible, and3) special structural support for the water and sewer pipes may be required. [Recommended Standards for Water Works 8.6.3] <p>This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.</p>
L-10	Distance	<p>The open end of an air relief pipe from automatic valves shall be extended a Distance \geq 1.0 ft above grade and provided with a screened, downward-facing elbow. The pipe from a manually operated valve shall be extended to the top of the pit. Use of manual air relief valves is recommended wherever possible. [Recommended Standards for Water Works 8.4.2] This requirement is applicable during the following months: All Year. Statistical basis: Not applicable.</p>
L-11	Pressure	<p>Pipes shall not be installed unless all points of the distribution system remain designed for ground level Pressure \geq 20 psi under all conditions of flow. [Recommended Standards for Water Works 8.1.1] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.</p>
L-12	Pressure	<p>Pressure \geq 30 psi must be available on the discharge side of all meters. [401 KAR 8:100 Section 4(2)] This requirement is applicable during the following months: All Year. Statistical basis: Instantaneous determination.</p>

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 7 of 21

Narrative Requirements:

Asbestos (Friable):

Condition No.	Condition
T-1	<p>Asbestos (Friable): If the existing water line to be tapped is asbestos concrete, then the contractor shall conform to OSHA regulations governing the handling of hazardous waste during the process of tapping the asbestos concrete line. Pieces of asbestos concrete resulting from the tap shall be double bagged, placed in a rigid container and disposed of in an approved landfill. [401 KAR 8:100 Section 1(7)]</p>

Additional Limitations:

Condition No.	Condition
T-2	<p>Additional Limitations: Water line installation shall be in accordance with AWWA standards or manufacturer recommendations. [Recommended Standards for Water Works 8.5.1]</p>
T-3	<p>Additional Limitations: Pipes, fittings, valves and fire hydrants shall conform to the latest standards issued by the AWWA or NSF (if such standards exist). PVC and PE piping used must be certified to ANSI/NSF Standard 61. [Recommended Standards for Water Works 8.0.1]</p>
T-4	<p>Additional Limitations: At high points in water lines, where air can accumulate, provisions shall be made to remove the air by means of hydrants or air relief valves. Automatic air relief valves shall not be used in situations where manhole or chamber flooding may occur. [Recommended Standards for Water Works 8.4.1]</p>
T-5	<p>Additional Limitations: All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement. [Recommended Standards for Water Works 8.5.4]</p>
T-6	<p>Additional Limitations: For lines that dead end, a fire hydrant or blow-off shall be required at the end of each 6 inch or larger diameter line and a flush hydrant or blow-off shall be required at the end of each line that is less than 6 inches in diameter. [Recommended Standards for Water Works 8.1.6]</p>
T-7	<p>Additional Limitations: For each fire or flush hydrant, auxiliary valves shall be installed in the hydrant lead pipe. [Recommended Standards for Water Works 8.3.3]</p>

Distribution-Major Construction
 Bracken Co Water District
 Facility Requirements
 Activity ID No.: APE20050003

Narrative Requirements:

Subfluvial Pipe Crossings:

Condition No.	Condition
---------------	-----------

T-13 Subfluvial Pipe Crossings: For subfluvial pipe crossings, a floodplain construction permit will not be required pursuant to KRS 151.250 if the following requirements of 401 KAR 4:050 Section 2 are met.

1) No material may be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc. during construction of pipe crossings.

2) Crossing trenches shall be backfilled as closely as possible to the original contour.

3) All excess material resulting from construction displacement in a crossing trench shall be disposed of outside the flood plain.

4) For erodible channels, there shall be at least 30 inches of backfill on top of all pipe or conduit points in the crossing.

5) For nonerodible channels, pipes or conduits in the crossing shall be encased on all sides by at least 6 inches of concrete with all pipe or conduit points in the crossing at least 6 inches below the original contour of the channel. [401 KAR 8:100 Section 1(7)]

T-14 Subfluvial Pipe Crossings: For subfluvial pipe crossings greater than 15 feet in width,

1) the pipe shall be of special construction, having flexible, restrained, or welded watertight joints, and

2) valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair.

Valves shall

a) be easily accessible,

b) not be subject to flooding, and

c) if closest to the supply source, be in a manhole with permanent taps made on each side of the valve to allow insertion of a small meter to determine leakage and for sampling purposes. [Recommended Standards for Water Works 8.7.2]

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 11 of 21

Limitation Requirements:

Condition No.	Parameter	Condition
L-6	Height	Pumping stations shall not be subject to flooding. To this end, 1) grading around stations shall lead surface drainage away and 2) stations shall be elevated or protected to a Height \geq 3 ft above the highest of the following: a) the 100-year flood elevation, or b) the highest recorded flood elevation. [Recommended Standards for Water Works 6.1.1, Recommended Standards for Water Works 6.0] This requirement is applicable during the following months: All Year. Statistical basis: Minimum.
L-7	Height	When a pump station has pits or compartments which must be entered, stairways or ladders shall be provided between all floors. Stairs shall have risers with a Height \leq 9 in, handrails on both sides, and treads with non-slip material wide enough for safety. [Recommended Standards for Water Works 6.2.3] This requirement is applicable during the following months: All Year. Statistical basis: Maximum.

Narrative Requirements:

Additional Limitations:

Condition No.	Condition
T-1	Additional Limitations: Pumping stations shall be so located that the proposed site will meet the requirements for hydraulics of the system. [Recommended Standards for Water Works 6.1]
T-2	Additional Limitations: Pumping stations shall be readily accessible at all times for servicing and repairs. [Recommended Standards for Water Works 6.1.1.b, Recommended Standards for Water Works 6.4.3]
T-3	Additional Limitations: Pumping stations shall be designed to prevent vandalism and protect against entrance of animals or unauthorized persons. [Recommended Standards for Water Works 6.1.1.d]
T-4	Additional Limitations: Pumping stations shall be of durable construction with outward-opening doors. [Recommended Standards for Water Works 6.2.b]

Distribution-Major Construction

Bracken Co Water District

Facility Requirements

Activity ID No.: APE20050003

Page 13 of 21

Narrative Requirements:

Additional Limitations:

Condition No.	Condition
T-15	<p>Additional Limitations: All electrical equipment and work shall conform with the applicable state and local electrical codes and the National Electrical Code. [Recommended Standards for Water Works 6.5, Recommended Standards for Water Works 6.2.7]</p>
T-16	<p>Additional Limitations: Pump stations shall be adequately lighted throughout. [Recommended Standards for Water Works 6.2.7]</p>
T-17	<p>Additional Limitations: All automatic pump stations shall be provided with automatic signaling apparatus which will report when the station is out of service. All remote controlled stations shall be electrically operated and controlled and shall have signaling apparatus of proven performance. [Recommended Standards for Water Works 6.5]</p>
T-18	<p>Additional Limitations: Automatic or remote control pump stations shall be located or shall have control devices setup so that the range between start and cutoff pressure prevents excessive pump cycling. [Recommended Standards for Water Works 6.4.d]</p>
T-19	<p>Additional Limitations: Equipment shall be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation. [Recommended Standards for Water Works 6.6.5]</p>
T-20	<p>Additional Limitations: Provisions shall be made to prevent energizing the motor in the event of a backspin cycle. [Recommended Standards for Water Works 6.6.5]</p>
T-21	<p>Additional Limitations: Pump stations shall be provided with enough heat to prevent freezing of equipment or treatment processes. [Recommended Standards for Water Works 6.2.4]</p>
T-22	<p>Additional Limitations: Pump stations shall have at least 2 pumps. Pumps shall be sized so that if any single pump is out service, the remaining pump or pumps shall be capable of providing the peak demand on the station. [Recommended Standards for Water Works 6.3, Recommended Standards for Water Works 6.4.1]</p>
T-23	<p>Additional Limitations: Provisions shall be made for pump alternation. [Recommended Standards for Water Works 6.6.5]</p>

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 15 of 21

Narrative Requirements:

Additional Limitations:

Condition No.	Condition
T-30	<p>Additional Limitations:</p> <p>To ensure continuous service when the primary power is interrupted, power supplied to pump stations shall be</p> <ul style="list-style-type: none"><li>a) from at least 2 independent sources or<li>b) from a primary source with a standby or auxiliary source provided. <p>If standby power is provided by onsite generators or engines, the fuel storage and fuel line must be designed to protect the water supply from contamination.</p> <p>[Recommended Standards for Water Works 6.6.6]</p>

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 17 of 21

Narrative Requirements:

Additional Limitations:

Condition No.	Condition
T-1	<p>Additional Limitations: The materials and designs used for storage structures shall provide stability and durability as well as protection for the quality of the stored water. Steel structures shall follow the AWWA standards wherever they are applicable. Other materials of construction are acceptable when properly designed to meet the requirements in this permit. [Recommended Standards for Water Works 7.0]</p>
T-2	<p>Additional Limitations: The safety of employees must be considered in the design of any tank. The design of tanks shall</p> <ol style="list-style-type: none">meet or exceed the minimum requirements of pertinent safety laws and regulations in the areas where the tanks are constructed,include ladders, ladder guards and balcony railings (where applicable),locate entrance hatches in safe places,provide railings or handholds where persons must transfer from an access tube to the water compartment, andconsider confined space entry requirements. <p>Additionally, if tanks have riser pipes over 8 inches in diameter, the tanks shall have protective bars over the riser openings inside of the tank. [Recommended Standards for Water Works 7.0.12]</p>
T-3	<p>Additional Limitations: Storage structures shall be designed with reasonably convenient access to the interior for cleaning and maintenance. Where space permits, at least 2 manholes shall be provided above the waterline at each water compartment. [Recommended Standards for Water Works 7.0.8]</p>
T-4	<p>Additional Limitations: Fencing, locks on access manholes, and other necessary precautions shall be provided to prevent trespassing, vandalism, and sabotage. [Recommended Standards for Water Works 7.0.4]</p>
T-5	<p>Additional Limitations: All storage structures and their appurtenances, especially the riser pipes, overflows, and vents, shall be designed to prevent freezing. [Recommended Standards for Water Works 7.0.13]</p>
T-6	<p>Additional Limitations: Tanks shall be constructed with no openings except properly constructed vents, manholes, overflows, risers, drains, control ports, and piping for inflow and outflow. Any pipes running through the roof or sidewall must be welded or properly gasketed. [Recommended Standards for Water Works 7.0.10]</p>
T-7	<p>Additional Limitations: All finished water storage structures shall have suitable watertight roofs and sidewalls which exclude birds, animals, insects, and excessive dust. [Recommended Standards for Water Works 7.0.3, Recommended Standards for Water Works 7.0.10]</p>

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 19 of 21

Narrative Requirements:

Additional Limitations:

Condition No.	Condition
T-16	<p>Additional Limitations: Appropriate sampling tap(s) shall be provided to facilitate collection of water samples for both bacteriologic and chemical analyses. [Recommended Standards for Water Works 7.0.19]</p>
T-17	<p>Additional Limitations: Storage structures shall be vented. Overflows shall not be considered as vents. Open construction between the sidewall and roof is not permitted. Vents shall</p> <ol style="list-style-type: none">prevent the entrance of rainwater,exclude birds and animals, andexclude insects and dust (as much as compatible with effective venting). <p>Vents may use four-mesh noncorrodible screen. [Recommended Standards for Water Works 7.0.9]</p>
T-18	<p>Additional Limitations: Adequate controls shall be provided to maintain levels in storage structures. The level controls shall be acceptable to the Division of Water. Level indicating devices should be provided at a central location. Overflow and low-level warnings or alarms should be located at places in the community where they will be under responsible surveillance 24 hrs a day. [401 KAR 8:100 Section 1(7), Recommended Standards for Water Works 7.3.3]</p>
T-19	<p>Additional Limitations: If storage structures have a catwalk over the water, the catwalk floor shall be solid with raised edges so that shoe scrapings and dirt will not fall into the water. [Recommended Standards for Water Works 7.0.14]</p>
T-20	<p>Additional Limitations: Proper protection shall be given to metal surfaces by</p> <ol style="list-style-type: none">paints or other protective coatings and/orcathodic protective devices. [Recommended Standards for Water Works 7.0.17]
T-21	<p>Additional Limitations: If cathodic protection is utilized,</p> <ol style="list-style-type: none">competent technical personnel should design and install the protection anda maintenance contract should be provided. [Recommended Standards for Water Works 7.0.17]
T-22	<p>Additional Limitations: If the interior of the storage structure is coated or lined, the coating or lining shall be of a type approved by the Division of Water for use in contact with potable water. [401 KAR 8:020 Section 2(19)]</p>

Distribution-Major Construction

Bracken Co Water District
Facility Requirements

Activity ID No.: APE20050003

Page 21 of 21

Narrative Requirements:

Condition No.	Condition
T-25	<p>If applicable, chlorination method 1 generally requires</p> <ul style="list-style-type: none">a) filling a storage structure to the overflow level with water providing a free chlorine Residual Disinfection \geq 10 ppm andb) i) completely draining the storage facility and refilling orb) ii) otherwise reducing (in accordance with method 1) the free chlorine residual to a level appropriate for distribution. [Recommended Standards for Water Works 7.0.18]
T-26	<p>If applicable, chlorination method 2 generally requires</p> <ul style="list-style-type: none">a) scrubbing or spraying the water-contact surfaces of a storage structure with a water solution having an available chlorine concentration = 200 ppm andb) purging of the strong chlorine solution and filling to the overflow level. [Recommended Standards for Water Works 7.0.18]
T-27	<p>If applicable, chlorination method 3 generally requires</p> <ul style="list-style-type: none">a) filling a storage structure to approximately 5% of the total storage volume with water having an available chlorine concentration of 50 ppm,b) continued filling of the storage structure to the overflow level with normal potable water, andc) purging the storage structure so that various disinfection by-products do not reach water consumers. [Recommended Standards for Water Works 7.0.18, 401 KAR 8:100 Section 1(7)]

ESTIMATED COST OF OPERATION {1}

A.	Operating Income:	
	Water Sales	\$ <u>695,500 {2}</u>
	Surcharge	<u>119,000</u>
	Other (Describe)	<u>23,000</u>
	Bulk Sales	<u>5,500</u>
	Total Operating Income	\$ <u>843,000</u>
B.	Operation and Maintenance Expenses:	
	Source of Supply Expense	\$ <u>280,600 {3}</u>
	Pumping Expense	\$ <u>29,400 {4}</u>
	Water Treatment Expense	\$ <u> </u>
	Transmission and Distribution Expense	\$ <u>100,600 {5}</u>
	Customer Accounts Expense	\$ <u> </u>
	Administrative and General Expense	\$ <u>264,500 {5}</u>
	Total Operating Expense	\$ <u>675,100</u>
	Net Operating Expense	\$ <u>167,900</u>
C.	Non-Operating Income:	
	Interest on Deposits	\$ <u>1,200</u>
	Other (Identify)	<u> </u>
	Total Non-Operating Income	\$ <u>1,200</u>
D.	Net Income	\$ <u>169,100</u>
E.	Debt Repayment:	
	RD P&I	\$ <u>54,300</u>
	Non-RUS Interest	\$ <u>67,200</u>
	Non-RUS Principal	\$ <u>143,300</u>
	KRWA Loan for Delisle Curve	\$ <u>177,500 {6}</u>
	Total Debt Repayment	\$ <u>442,300</u>
F.	Balance Available for Coverage	\$ <u>-273,200</u>

{1} Based on 2004 Audit

{2} Includes 75 new customers with an average monthly bill of \$23.84.

{3} Includes usage from 75 new customers averaging 4,500 gal/mon.

Cost of water is \$1.29/1000.

{4} Includes \$500/month for new P.S.

{5} Includes 3% increase over 2004 Audit.

{6} KRWA Loan (\$2,650,000 @ 5.25% for 30 yrs.)



HMB Professional Engineers, Inc.
 3 HMB Circle, US 460
 Frankfort, KY 40601
 Phone: 502/695-9800
 Fax: 502/695-9810

LETTER OF TRANSMITTAL

DATE	2/7/2006	JOB NO.	4098
ATTENTION			
RE:	Delisle Curve Water Project		
	Bracken County Water District		

TO Public Service Commission

WE ARE SENDING YOU Attached Under Separate Cover Via: _____ the following items:

Shop Drawings Prints Plans Samples Specifications

Copy of Letter Change Order _____

COPIES	DATE	NO.	DESCRIPTION
2			Contract VII - Plans and Specs
2			Contract VIII - Plans and Specs

RECEIVED
 FEB 7 2006
 PUBLIC SERVICE
 COMMISSION

THESE ARE TRANSMITTED as checked below:

- For Approval
- For Your Use
- As Requested
- For Review and Comment
- FOR BIDS DUE _____
- Approved as Submitted
- Approved as Noted
- Returned for Corrections
- _____
- PRINTS RETURNED AFTER LOAN TO US

REMARKS

If you have any questions, please call.

COPY TO _____

SIGNED: Jeff Reynolds, P.E.

If enclosures are not as noted, kindly notify us at once

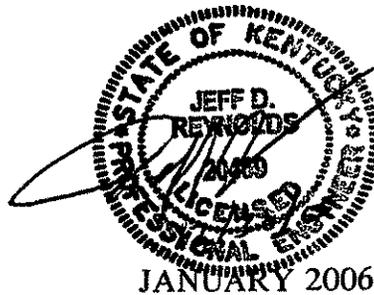
CONTRACT VII

DELISLE CURVE WATER PROJECT
BRACKEN COUNTY WATER DISTRICT
BRACKEN COUNTY, KENTUCKY

RECEIVED

FEB - 7 2006

PUBLIC SERVICE
COMMISSION



Prepared By:

HMB Professional Engineers, Inc.
3 HMB Circle, US 460
Frankfort, Kentucky 40601

TABLE OF CONTENTS

1.	Advertisement for Bids.....	AD-1 to AD-3
2.	Information for Bidders	IB-1 to IB-3
3.	General Conditions	GC-1 to GC-32
6.	Labor Regulations.....	LR-1 to LR-21
7.	Payment & Performance Bonds.....	PB-1 to PB-6
8.	Contract Agreement.....	CON-1 to CON-3
9.	Notice of Award.....	NA-1
10.	Notice to Proceed.....	NP-1
11.	Change Order Format	CO-1
12.	Special Conditions	SC-1 to SC-5
13.	Technical Specification	

DIVISION 1 - GENERAL REQUIREMENTS

Section	01010	Summary of Work	01010-1
	01016	Occupancy.....	01016-1
	01041	Project Coordination.....	01041-1 to 01041-2
	01150	Measurement and Payment.....	01150-1 to 01150-7
	01340	Shop Drawings, Product Data and Samples	01340-1 to 01340-12
	01562	Dust Control.....	01562-1
	01610	Transportation and Handling	01610-1 to 01610-2
	01630	Substitution and Options	01630-1 to 01630-3
	01710	Cleaning.....	01710-1 to 01710-4
	01720	Record Documents.....	01720-1 to 01720-4
	01740	Warranties and Bonds.....	01740-1 to 01740-2

DIVISION 2 - SITE WORK

Section	02010	Subsurface.....	02010-1
	02140	Dewatering.....	02140-1 to 02140-2
	02200	Earthwork	02200-1 to 02200-17
	02255	Crushed Stone and Dense Grade Aggregate.....	02255-1 to 02255-2
	02513	Bituminous Concrete Paving.....	02513-1 to 02513-5
	02665	Water Mains and Accessories.....	02665-1 to 02665-27
	02933	Seeding	02933-1 to 02933-4
	02957	Erosion Control and Stabilization.....	02957-1 to 02957-3

DIVISION 3 - CONCRETE

Section	03300	Cast-in-place Concrete.....	03300-1 to 03300-28
	03310	Flowable Fill Concrete.....	03310-1 to 03310-2

E
L
E
E
L
E
E
L
E
E
L
E
L
L
L
L
L
L
L

DIVISION 11 - EQUIPMENT

Section 11200 Underground Packaged Booster Pump Station..... 11200-1 to 11200-20

14. Appendices

- A. DOT Permit**
- B. County Road Permit**
- C. Bracken County Water District
Standard Specifications**

15. Bid ScheduleBS-1 to BS-13

ADVERTISEMENT FOR BIDS

CONTRACT VII
DELISLE CURVE WATER PROJECT
BRACKEN COUNTY WATER DISTRICT
BRACKEN COUNTY, KENTUCKY

JANUARY 2006

Sealed proposals for the following work will be received by the Bracken County Water District at 103 Woodward Avenue, Brooksville, Kentucky 41004 until 1:00 p.m. (local time) January 18, 2006, for furnishing labor and materials and performing all work as set forth in this Advertisement for Bids, General Conditions, Specifications and/or Drawings prepared by HMB Professional Engineers, Inc., 3 HMB Circle, US 460, Frankfort, Kentucky 40601.

Immediately following the scheduled closing time for the reception of bids, all proposals which have been submitted in accordance with the above conditions will be publicly opened and read aloud.

The work to be bid upon is described as follows:

64,600 L.F. ± 8" Water Main Appurtenances.
39,200 L.F. ± 6" Water Main Appurtenances.
39,900 L.F. ± 4" Water Main Appurtenances.
300 GPM Booster Pump Station

Drawings, Specifications and Contract Documents may be examined at the following places:

F.W. Dodge Corporation
One Paragon Centre-Suite 230
2525 Harrodsburg Road
Lexington, KY 40504

HMB Professional Engineers, Inc.
3 HMB Circle, US 460
Frankfort, KY 40601

Builder's Exchange of Louisville
2300 Meadow Drive
P.O. Box 5398
Louisville, KY 40205

Associated General Contractors
2321 Fortune Drive, Suite 112
Lexington, KY 40505

F.W. Dodge/ABC Planroom
1812 Taylor Avenue
Louisville, KY 40213

Bracken County Water District
103 Woodward Avenue
Brooksville, KY 41004

Facilities, Section 109 and the Contract Work Hours Standard Act.

Bidders must certify that they do not, and will not, maintain or provide for their employees any facilities that are segregated on the basis of race, color, creed or national origin.

Federal law prohibits discrimination on the grounds of race, color, national origin, religion, age, handicap, and sex in this project. Minority firms are particularly encouraged to participate.

Charles Tarvin, Chairman

INSTRUCTION TO BIDDERS

BIDS will be received by See Advertisement (herein called the "OWNER"), at See Advertisement until See Advertisement 20 _____, and then at said office publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to See Advertisement at _____ . Each sealed envelope containing a BID must be plainly marked on the outside as BID for _____ and the envelope should bear on the outside the BIDDER'S name, address, and license number if applicable, and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at _____ See Advertisement _____ .

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 90 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID Schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the contractor from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID bond payable to the OWNER for five percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will

return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A performance BOND and a payment BOND each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the performance BOND and payment BOND within ten (10) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The OWNER within ten (10) days of receipt of acceptable performance BOND, payment BOND and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the OWNER not execute the Agreement within such period, the BIDDER may by WRITTEN NOTICE withdraw the signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The NOTICE TO PROCEED shall be issued within ten (10) days of the execution of the Agreement by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER AND CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.

A conditional or qualified BID will not be accepted.

Award will be made to the lowest responsible BIDDER.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the SUPPLEMENTAL GENERAL CONDITIONS.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

Inspection trips for prospective BIDDERS will leave from the office of the none scheduled at _____.

The ENGINEER IS HMB Professional Engineers, Inc.. The ENGINEER'S address is 3 HMB Circle, US 460, Frankfort, KY 40601.

GENERAL CONDITIONS

1. DEFINITIONS
2. CONTRACT AND CONTRACT DOCUMENTS
3. SCHEDULES, REPORTS AND RECORDS
4. ADDITIONAL INSTRUCTIONS AND DETAILED DRAWINGS
5. DRAWINGS AND SPECIFICATIONS
6. SHOP OR SETTING DRAWINGS
7. MATERIALS, SERVICES AND FACILITIES
8. CONTRACTOR'S TITLE TO MATERIALS
9. INSPECTION AND TESTING
10. SUBSTITUTIONS
11. PATENTS
12. SURVEYS, PERMITS, AND REGULATIONS
13. PROTECTION OF WORK, PROPERTY AND PERSONS
14. CONTRACTOR'S OBLIGATION FOR SUPERVISION
15. CHANGES IN WORK
16. CHANGES IN CONTRACT PRICE
17. TIME FOR COMPLETION AND LIQUIDATED DAMAGES
18. CORRECTION OF WORK
19. SUBSURFACE CONDITIONS
20. SUSPENSION OF WORK, TERMINATION AND DELAY
21. PAYMENTS TO CONTRACTOR
22. PAYMENTS BY CONTRACTOR
23. ACCEPTANCE OF FINAL PAYMENT AS RELEASE
24. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE
25. CONTRACT SECURITY

26. ASSIGNMENTS
27. INDEMNIFICATION
28. SEPARATE CONTRACTS
29. SUBCONTRACTING
30. ENGINEERS AUTHORITY
31. LAND AND RIGHTS-OF-WAY
32. GUARANTEE
33. ARBITRATION
34. TAXES
35. USE OF PREMISES AND REMOVAL OF DEBRIS
36. QUANTITIES OF ESTIMATES
37. CONFLICTING CONDITIONS
38. NOTICE AND SERVICE THEREOF
39. REQUIRED PROVISIONS DEEMED INSERTED
40. SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION
41. LABOR STANDARDS
42. INTEREST OF FEDERAL, STATE OR LOCAL OFFICIALS
43. OTHER PROHIBITED INTERESTS
44. EXISTING UTILITIES
45. STANDARD SPECIFICATIONS
46. SANITARY FACILITIES
47. SUPERVISION OF INSTALLATION
48. AIR AND WATER POLLUTION CONTROL
49. USE OF CHEMICALS
50. DAMAGE TO EXISTING LANDSCAPING, PAVEMENT, STRUCTURES, SIDEWALKS, CURBS, ETC.

1. DEFINITIONS

- 1.1 The following terms used in the Contract Documents shall be applicable to both the singular and plural and be defined as follows:
- 1.2 Addenda - Instructions, either written or graphic issued prior to the execution of the Agreement or portions thereof which modify or interpret the Contract Documents, Drawings, and Specifications, by deletions, additions, clarifications or corrections.
- 1.3 Bid - The proposal or offer submitted by the Bidder on prescribed forms setting forth prices for work to be performed.
- 1.4 Bidder - A person, firm or corporation submitting a Bid for the proposed work.
- 1.5 Bonds - Instruments of Security in the form of Bid, Performance or Payment Bonds, furnished by the Contractor and surety in accordance with Contract Documents.
- 1.6 Change Order - A written order to the Contractor authorizing revisions, deletions, or additions to the work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.
- 1.7 Contract Documents - The Contract and all other instruments associated with the Contract including Advertisement For Bids, Information For Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, Notice of Award, Notice To Proceed, Change Orders, Drawings, Specifications and Addenda.
- 1.8 Contract Price - The total sum of monies payable to the Contractor under the conditions and terms set forth in the Contract Documents.
- 1.9 Contract Time - The number of calendar days set forth in the Contract Documents for completion of the work.
- 1.10 Contractor - A person, firm or corporation with whom the Owner has executed a Contract or Agreement.
- 1.11 Drawings - A portion of the Contract Documents that illustrate the characteristics and scope of Work to be performed and which have been prepared and approved by the Engineer and appropriate Regulatory Agencies.

- 1.12 Engineer - The person, firms or corporations named as such in the Contract Documents.
- 1.13 Field Order - A written notice or order issued by the Engineer effecting a change in the Work that does not result in an amendment in Contract Price or Contract Time.
- 1.14 Notice of Award - A written notice issued by the Owner to the Bidder accepting his Bid.
- 1.15 Notice to Proceed - A written document issued by the Owner to the Contractor authorizing initiation of the Work and firmly establishing the date of initiation of such Work.
- 1.16 Owner - The public body or authority for whom the Work is being performed.
- 1.17 Project - A task to be performed as set forth in the Contract Documents.
- 1.18 Resident Project Representative - An authorized representative of the Owner that is assigned to the Project site or any portion thereof.
- 1.19 Shop Drawings - Diagrams, brochures, schedules, drawings, and other data that have been prepared by the Contractor, Subcontractor, manufacturers, suppliers, or distributors, that illustrates installations or fabrication of specific portions of the Work.
- 1.20 Specifications - A portion of the Contract Documents that contains written descriptions concerning materials, equipment, construction methods, standards, and workmanship.
- 1.21 Subcontractor - An individual, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of the Work.
- 1.22 Substantial Completion - The date certified by the Engineer that construction on the Project or any portion thereof is sufficiently complete, in accordance with Contract Documents to permit the Project or portions thereof to be utilized for the purpose intended.

- 1.23 Supplemental General Conditions - Modifications to the General Conditions that may be required by the Federal, State, or Local agencies for participation in the Project and approved in writing by the agency prior to inclusion in the Contract Documents or such requirements that may be imposed by applicable state law.
- 1.24 Supplier - Any person, firm or organization that supplies material or equipment for accomplishing the Work, including fabrication, but does not perform labor at the Work site.
- 1.25 Work - Labor, materials, and equipment necessary to satisfy the construction requirements by the Contractor in accordance with the Contract Documents.
- 1.26 Written Notice - A written communication to any party of the Agreement. Such notices will be considered delivered when posted by certified or registered mail to the last known address of the addressee or when hand delivered to addressee or his authorized representative.

2. CONTRACT AND CONTRACT DOCUMENTS

Plans, Specifications and Addenda shall form a part of the contract and the provisions thereof shall be as binding upon the parties hereto as if they were fully set forth herein. Tables of Content, Titles, and Headings contained in said documents are solely for the purpose of reference and have no limiting effect of the interpretation of the provisions to which referenced.

3. SCHEDULES, REPORTS AND RECORDS

- 3.1 The Contractor shall submit to the Owner such schedules of quantities, costs, progress reports, estimates, record and other information as may be requested by the Owner.
- 3.2 The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Owner/Engineer, prepare and submit to the Owner/Engineer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the

Contractor fails to submit a schedule within the time prescribed, the Owner/Engineer may withhold approval of progress payments until the Contractor submits the required schedule.

- 3.3 The Contractor shall enter the actual progress on the chart as directed by the Owner/Engineer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Owner/Engineer. If, in the opinion of the Owner/Engineer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Owner/Engineer without additional cost to the Owner. In this circumstance, the Owner/Engineer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount to construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Owner/Engineer deems necessary to demonstrate how the approved rate of progress will be regained.
- 3.4 The Contractor shall also furnish on forms supplied by the Owner (a) a detailed estimate giving a complete breakdown of the Contract Price and (b) periodic itemized estimates of Work done for the purpose of making partial payments thereon. The cost employed in making up any of these schedules will be used only for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the Contract Price.
- 3.5 The Contractor will also submit dates for submission of Shop Drawings, the beginning of manufacture, testing and installation of materials, equipment and supplies. The Contractor shall also submit dates that special detail drawings will be required, if any, by the Engineer.
- 3.6 Failure of the Contractor to comply with the requirements of the Owner/Engineer under this clause shall be grounds for a determination by the Owner/Engineer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Owner/Engineer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the terms of this contract.

4. ADDITIONAL INSTRUCTIONS AND DETAILED DRAWINGS

- 4.1 The Contractor will be provided with additional instructions and detailed small letters Drawings as necessary to carry out the Work set forth in the Contract

Documents.

- 4.2 Additional drawings and instructions supplied to the Contractor will become a part of the Contract Documents. In the event of conflict between additional drawings and instructions and the Contract Documents, the Contractor shall notify the Engineer immediately in writing.

5. DRAWINGS AND SPECIFICATIONS

- 5.1 The Drawings, Specifications, and Addenda shall become a part of the Contract Documents and are provided with the intent that the Contractor shall furnish all labor, materials, tools, equipment and transportation necessary for proper execution of the Work in accordance with the Contract Documents and all other incidental work necessary to complete the project in an acceptable manner, ready for use, occupancy or operation by the Owner.
- 5.2 The Engineer, without charge, will furnish to the Contractor not more than eight (8) sets of the Plans and Specifications. If additional sets of documents are required by the Contractor for the proper handling of the Work, such documents will be furnished to the Contractor at cost.
- 5.3 Should there be conflict between Drawings and Specifications, the Specifications shall govern and detailed Drawings shall govern over general Drawings. Figure dimensions on Drawings shall govern over scale dimensions.
- 5.4 All work or materials shown on the Plans and not mentioned in the Specifications or any work specified and not shown on the Plans, shall be furnished, performed, and done by the Contractor as if the same were both mentioned in the Specifications and shown on the Plans.
- 5.5 Should the Contractor in preparing his Bid find anything necessary for the construction of the Project that is not mentioned in the Specifications or shown on the Plans, or find any other discrepancy in the Specifications, Plans or Contract Documents, he shall notify the Engineer so that such discrepancies may be corrected by addendum prior to the letting. Should the Contractor fail to notify the Engineer of such discrepancies, it will be assumed that his Bid included everything necessary for the complete construction in the spirit and intent of the designs shown.

- 5.6 In the event the Contractor should note discrepancies between the Drawings and the Specifications, and site conditions or any other inconsistencies, or ambiguities, such inconsistencies or ambiguities shall be reported immediately to the Engineer in writing. The Engineer shall promptly correct such inconsistencies or ambiguities in writing. Any Work done by the Contractor subsequent to his discovery of such inconsistencies or ambiguities shall be done at the Contractor's risk.
- 5.7 The Contractor shall, during the course of the construction, maintain an updated set of plans, marked by the Contractor, showing all deviations from the original and such notes as required to clarify the cause of such deviations and showing final locations of underground utilities such as sewer service connections and buried valves by giving offset distances to surface improvements such as building corners, curbs, manholes, etc. The purpose of these updated plans are to facilitate the completion of the record drawings by the Engineer after the completion of the Work. Nothing in this section shall be construed to relieve the Contractor from obtaining the Engineer's prior written approval for any deviation from the Plans or Specifications.

6. SHOP OR SETTING DRAWINGS

- 6.1 The Contractor shall promptly submit to the Engineer four (4) copies of each shop Drawing regarding proposed materials and equipment to be supplied for the project. Subsequent to examination of such Shop Drawings by the Engineer and the return thereof, the Contractor shall make such corrections to the Shop Drawings as have been indicated and shall furnish the Engineer with two (2) corrected copies. Regardless of corrections made on or review given to such Shop Drawings by the Engineer, any Shop Drawing which substantially deviates from the requirements of the Contract Documents shall be evidenced by a Change Order. Review of Shop Drawings by the Engineer shall in no way relieve the Contractor from responsibility for deviations from the Contract Documents unless specifically stated in writing by the Engineer.
- 6.2 Work requiring the submission of a Shop Drawing by the Contractor shall not be initiated until the Shop Drawing has been submitted to and reviewed by the Engineer. The Contractor shall certify to the Engineer that he has checked and approved the Shop Drawings and that they are in accordance with the requirements of the Contract Documents.

7. MATERIALS, SERVICES AND FACILITIES

- 7.1 Except as otherwise stated in the Contract Documents, the Contractor shall furnish any pay for all materials, labor, tools, equipment, utilities, transportation, supervision, temporary construction and all other services and facilities required in the execution, completion and delivery of the Work in accordance with the Contract Documents.
- 7.2 Storage of materials and equipment to be used in the Project shall be accomplished in a manner to insure security, preservation of quality, and suitability for incorporation in the Work.
- 7.3 Manufactured equipment and materials shall be installed, constructed and erected by the Contractor in strict accordance with the manufacturer's direction unless specifically directed otherwise in writing by the Engineer.
- 7.4 Manufactured equipment and materials to be used in the Project shall be the same as samples submitted to and approved by the Engineer. Second hand or salvaged materials will not be permitted unless specifically provided for in the Contract Documents.
- 7.5 Any Work necessary to be performed after regular hours, on Sundays or Legal Holidays, shall be performed without additional expense to the Owner.

8. CONTRACTOR'S TITLE TO MATERIALS

No manufactured equipment, materials, or supplies to be used in the Work shall be purchased by the Contractor or Subcontractor subject to any chattel mortgage, conditional sales contract or other agreement by which an interest is retained by the Seller. The Contractor and Subcontractor shall warrant that he has good title to all materials and supplies used by him in the Work, free of all liens, claims or encumbrances.

9. INSPECTION AND TESTING

- 9.1 All manufactured equipment, materials and supplies used in the construction of the Project shall be subject to inspection, testing, and observation in accordance with generally accepted standards as required and defined in the Contract Documents.

- 9.2 The cost of testing and inspection services required by the Contract Documents shall be borne by the Contractor unless otherwise specified.
- 9.3 All other inspection and testing services not required by the Contract Documents, shall be borne by the Owner.
- 9.4 In the event that Contract Documents, laws, ordinances, regulations, rules, orders or other directions of any public authority having jurisdiction over the Work requires specific inspection, testing or approval of someone other than the Contractor, the Contractor shall provide the Engineer timely notice of readiness and the Contractor shall furnish the Engineer with the required certificates of inspection, testing or approval as appropriate.
- 9.5 Neither observation by the Engineer nor inspections, tests, or approvals by others relieve the Contractor of his obligations to perform the Work as required in the Contract Documents.
- 9.6 The Engineer, Owner and their representatives shall have access to the Work at all times. In addition, representatives and agents of Federal, State and Local governments having jurisdiction of any portion of the Work shall be permitted to inspect the Work, materials, payrolls, records of personnel, invoices of materials and other relevant data and records, in accordance with Federal laws. Proper facilities shall be provided by the Contractor for such access, observation, inspection and testing of the Work.
- 9.7 Should any Work be covered contrary to the written instructions of the Engineer, such Work shall be uncovered for observation and replaced at the Contractor's expense.
- 9.8 Should any Work be covered which the Engineer has not specifically requested to observe prior to its being covered, or should the Engineer consider it necessary that such Work be inspected or tested by others, the Contractor, shall, at the Engineer's written request, uncover or otherwise expose the Work in question for observation, inspection or testing. The Contractor, shall furnish all labor, materials and equipment necessary to accomplish this purpose. If the Engineer determines that such work is defective or in conflict with the Contract Documents, the Contractor shall bear all expenses of such uncovering, exposure, observation, inspection or testing as well as satisfactory reconstruction. If such work is found not to be defective, the Contractor shall be allowed an increase in Contract Price or an extension of Contract Time or both, attributable to such uncovering, exposure, observation, and inspection.

An appropriate Change Order shall be prepared and issued by the Engineer.

10. SUBSTITUTIONS

Whenever a material, article or equipment is identified on the Drawings or in the Specifications by brand name, manufacturer's name or catalog number, it shall be understood that such reference is for defining the performance, requirements, quality, capacity and other salient features of that being specified. The Contractor may recommend substitution, by brand name or catalog number, for materials, articles, or equipment provided it is of equal substance and function to that referred to in the Contract Documents. If, in the opinion of the Engineer, recommended alternates are of equal substance, function and capacity as that specified, the Engineer may approve the substitution and use by the Contractor. Any cost differential shall be adjusted in the Contract Price and the Contract Documents shall be modified by a Change Order. The Contractor shall warrant that if substitutions are approved, no major changes in function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute requested by the Contractor, shall be made by the Contractor without a change in Contract Time or Contract Price.

11. PATENTS

- 11.1 The Contractor shall hold and save the Owner and its officers, agents and employees harmless, from liability of any type, including cost and expenses for or on account of, any type, including cost and expenses for or on account of, any patented or unpatented inventions, process, or article manufactured and used in the performance of the Work and its intended use thereafter, unless otherwise stipulated in the Contract Documents.
- 11.2 If the Contractor uses any device, materials or designs covered by patent, copyright or letters, he shall provide for such use by obtaining a suitable agreement with the Owner of such patented or copyrighted material, device or design. It shall be understood and agreed by the Contractor that, without exception, the Contract Price shall include all royalties or costs arising from the use of such materials, devices and designs used in the Work. The Contractor or his Sureties shall indemnify and save harmless the Owner from any and all claims for infringement by reason of use of such patented or copyrighted device, materials, or design or any trademark in connection with the Work to be performed within the scope of the Contract Documents and shall indemnify the Owner for any costs, expenses or damage which by reason of infringement may be due and payable after completion of the Work.

12. SURVEYS, PERMITS, AND REGULATIONS

- 12.1 Land surveys and/or base lines for locating principal structures associated with the Project together with a suitable number of bench marks near the Work site will be furnished by the Owner and shown in the Contract Documents. Utilizing information provided by the Owner, the Contractor shall develop all detail surveys needed for construction, unless specified otherwise in the Contract Documents, including but not limited to slope stakes, batter boards, stakes for pile location, working points, line elevations and cut sheets.
- 12.2 The Contractor shall assure preservation of bench marks, and other reference points. In the event of willful or careless destruction, he shall be charged with the resulting expense and shall be held responsible for any errors or mistakes resulting from such loss of bench marks or other reference points.
- 12.3 Permits and licenses of a temporary nature necessary for the prosecution of the Work shall be secured and paid for by the Contractor unless otherwise stated in the Supplemental General Conditions or Special Conditions Permits, licenses and easements for permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn and specified. If the Contractor observes that the Contract Documents are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in Section 15, Changes In Work.

13. PROTECTION OF WORK, PROPERTY AND PERSONS

- 13.1 The Contractor will be responsible for initiating, maintaining and supervising all safety precaution and programs in connection with the Work. He will take all necessary precaution for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- 13.2 The Contractor will comply with all applicable laws, ordinances, rules,

regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor will remedy all damage, injury or loss to any property caused directly or indirectly in whole or in part by the Contractor, and subcontractor or anyone for whose acts any of them be liable.

- 13.3 In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. He will give the Engineer prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved.

14. CONTRACTOR'S OBLIGATION FOR SUPERVISION

The Contractor will supervise and direct the Work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the Work a qualified supervisor or superintendent who shall have been designated by the Contractor as the Contractor's representative at the site. The supervisor shall have full authority to act on behalf of the Contractor and all communications given to the supervisor shall be as binding as if given to the Contractor. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

15. CHANGES IN WORK

- 15.1 The Owner may at any time, as the need arises, order changes within the scope of the Work without invalidating the Agreement. If such changes increase or decrease the amount due under the Contract Documents, or in the time required for performance of the Work, an equitable adjustment shall be authorized by Change Order.
- 15.2 The Engineer, also, may at any time, by issuing a Field Order, make changes in the details of the Work. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Engineer unless the Contractor believes that such Field Order entitles him to a change in Contract Price or Time or both, in which event he shall give the Engineer written notice thereof within seven (7) days after receipt of the ordered change. Thereafter, the

Contractor shall document the basis for the change in Contract Price or Time within thirty (30) days. The Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner.

16. CHANGES IN CONTRACT PRICE

The Contract Price may be changed only by a Change Order. The value of any Work covered by a Change Order or of any claim for increase or decrease in the Contract Price shall be negotiated and determined by one or more of the following methods in the order of precedence listed below:

- (a) An agreed lump sum
- (b) The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the Work. In addition, there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the Work to cover the cost of general overhead and profit.

17. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

17.1 The date of beginning and the time for completion of the Contract Documents and the Work embraced shall be commenced on a date specified in the Notice to Proceed.

17.2 The Contractor will proceed with the Work at such a rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed by and between the Contractor and the Owner that the Contract Time for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the Work.

17.3 If the Contractor shall fail to complete the Work within the Contract Time, or extension of time granted by the Owner, then the Contractor will pay to the Owner the amount for liquidated damages as specified in the Bid for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

17.4 The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following and the Contractor has within seven calendar days given Written Notice of such delay to the Owner or Engineer.

17.4.1 To any preference priority or allocation order duly issued by the Owner.

17.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the Contractor including but not restricted to acts of God or of the public enemy, acts of the Owner, acts of another Contractor in the performance of contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather.

17.4.3 To any delays of Subcontractors occasioned by any of the causes specified in paragraphs 17.4.1 and 17.4.2 of this article.

18. CORRECTION OF WORK

18.1 The Contractor shall promptly remove from the premises all Work rejected by the Engineer for failure to comply with the Contract Documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to the Owner and shall bear the expense of making good all Work of other Contractors destroyed or damaged by such removal or replacement.

18.2 All removal and replacement Work shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected Work within ten (10) days after receipt of Written Notice, the Owner may remove such Work and store the materials at the expense of the Contractor.

19. SUBSURFACE CONDITIONS

19.1 The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Owner by Written Notice of:

19.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents: or

19.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

19.2 The Owner shall promptly investigate the conditions, and if he finds that such

conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the Work, and equitable adjustment shall be made and the Contract Documents shall be modified by a Change Order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given the required Written Notice; provided that the Owner may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

- 19.3 Information such as rock soundings or soil borings shown on the plans depicting subsurface conditions are thought to be representative but cannot be guaranteed accurate. It is the Contractor's responsibility to make any additional investigations necessary to ascertain or verify subsurface conditions. If subsurface conditions different from those indicated on the plans are encountered during construction, there will be no increase in Contract Price unless provided by unit prices listed on the Bid Form or by Change Order.

20. SUSPENSION OF WORK, TERMINATION AND DELAY

- 20.1 The Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by Written Notice to the Contractor and the Engineer. Such Written Notice shall fix the date on which Work shall be resumed. The Contractor will resume that Work on the date so fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension.
- 20.2 If the Contractor is adjudged as bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to subcontractors or for labor, materials, equipment, or if he disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction of the Work or if he disregards the authority of the Engineer, or if he otherwise violates any provision of the Contract Documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and his Surety a minimum of ten (10) days from delivery of a Written Notice, terminate the services of the Contractor and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish the

Work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor will pay the difference to the Owner. Such cost incurred by the Owner will be determined by the Engineer and incorporated in a Change Order.

- 20.3 Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any right of the Owner against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from compliance with the Contract Documents.
- 20.4 After ten (10) days from delivery of a Written Notice to the Contractor and the Engineer, the Owner may without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate the Contract. In such case, the Contractor shall be paid for all work executed and any expense sustained plus reasonable profit.
- 20.5 If through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days of its approval and presentation, then the Contractor may, after ten (10) days from delivery of a Written Notice to the Owner and the Engineer, terminate the Contract and recover from the Owner payment for all Work executed and all expenses sustained. In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days Written Notice to the Owner and the Engineer, stop the Work until he has been paid all amounts then due, in which event and upon resumption of the Work, Change Orders shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.
- 20.6 In the event that the Owner or Engineer determine that the Work is not being done in accordance with the Contract Documents, including, but not limited to, the fact that the Contractor does not have adequate supervision on site in accordance with Section 14 (Contractor's Obligation For Supervision) of these General Conditions, the Contractor may be ordered to stop work until he is in compliance with the Contract Documents without an increase in contract

amount or time for completion.

21. PAYMENTS TO CONTRACTOR

- 21.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the Owner, as will establish the Owner's title to the material and equipment and protect his interest therein, including applicable insurance. The Engineer will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within ten (10) days of presentation to him of an approved partial payment estimate, or at an earlier date if the Owner has received federal reimbursement funds to cover the payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate. The Owner shall retain ten (10) percent of the amount of each payment until 50% of the work is completed at which time the retainage may be reduced to 5% if satisfactory progress is being made. When the Work is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced below five (5) percent to only that amount necessary to assure completion. On completion and acceptance of a part of the Work on which the price is stated separately in the Contract Documents, payment may be made in full, including retained percentages, less authorized deductions.
- 21.2 The request for payment may also include all allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.
- 21.3 Prior to Substantial Completion, the Owner with the approval of the Engineer and with the concurrence of the Contractor, may use any completed or substantially completed portions of the Work.
- 21.4 Performance of related work on the premises by the Owner or use of partially completed portions of the Work by the Owner shall in no way be construed as relieving the Contractor of the sole responsibility for completing all Work in

accordance with the Contract Documents, for care and protection of the Work, and for restoration of any damaged Work except such as may be caused by agents or employees of the Owner.

21.5 Upon completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that the Work has been accepted by him under the conditions of the Contract Documents, the entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the Owner, shall be paid to the Contractor within thirty (30) days of completion and acceptance of the Work.

21.6 The Contractor will indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, furnishers of materials and machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the request of the Owner, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor, his Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the Contract Documents by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

22. PAYMENTS BY CONTRACTOR

The Contractor shall pay: (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered, (b) for all materials, tools, and other expendable equipment to the extent of 90% of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at the site of the Project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the Work in or on which such materials, tools and equipment are incorporated or used, and (c) to each of his Subcontractors, not later than the 15th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the Work performed by his Subcontractors to the extent of each

Subcontractor's interest therein.

23. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Owner and others relating to or arising out of this Work. Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents of the Performance Bond and Payment Bonds.

24. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

24.1 The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's execution of the Work, whether such execution be by himself or by an Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

24.1.1 Claims under workmen's compensations, disability benefit and other similar employee benefit acts;

24.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

24.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

24.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained: (a) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (b) by any other person; and

24.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

24.2 All insurance to be procured and maintained by Contractor pursuant to this Contract shall be with Best A-rated companies acceptable to Owner, and certificates evidencing such insurance acceptable to Owner shall be filed with the Owner prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies shall not be canceled unless at least fifteen (15) days prior written notice has been given to Owner. Owner shall be named as an additional insured on all said policies

of insurance.

24.3 The Contractor shall procure and maintain, at his own expense during the Contract Time, liability insurance as hereinafter specified.

24.3.1 Contractor's General Public Liability and Property Damage Insurance including vehicle coverage issued to the Contractor and protecting him from all claims for destruction of or damage to property arising out of or in connection with any operations under the Contract Documents, whether such operations be by himself or by any Subcontractor under him, or anyone directly or indirectly employed by the Contractor or by a Subcontractor under him. Insurance shall be written with a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than \$1,000,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$3,000,000 aggregate for any damages arising out of bodily injury, including death at any time resulting therefrom sustained by two or more persons in any one accident.

24.3.2 The Contractor shall acquire and maintain, Fire and Extended Coverage Insurance upon the Project to the full insurable value thereof for the benefits of the Owner, the Contractor, and the Subcontractors as their interest may appear. This provision shall in no way release the Contractor or Contractor's Surety from obligations under the Contract Documents to fully complete the Project.

24.4 The Contractor shall procure and maintain, at his own expense, during the Contract Time, in accordance with the provisions of the laws of the state in which the Work is performed, Workmen's Compensation Insurance, including occupational disease provisions, for all of his employees at the site of the Project. In case of any work sublet, the Contractor shall require such Subcontractor similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this contract at the site of the Project is not protected under Workmen's Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide adequate and suitable insurance for the protection of his employees not otherwise protected.

24.5 The Contractor shall secure, "All Risk" type Builder's Risk Insurance of Work to be performed. Unless specifically authorized by the Owner, the amount of

such insurance shall not be less than the Contract Price totaled in the Bid. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the Contract Time, and until the Work is accepted by the Owner. The policy shall name as the insured the Contractor, the Engineer, and the Owner. If the Builder's Risk Insurance excludes flood damage, the Contractor shall be required to secure the maximum amount of Federal Flood Insurance available for the Contract.

25. CONTRACT SECURITY

The Contractor shall within ten (10) days after receipt of the Notice of Award furnish the Owner with a Performance Bond and a Payment Bond in penal sums equal to the amount of the Contract Price conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions, and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the Work provided by the Contract Documents. Such Bonds shall be executed by the Contractor and all corporate bonding company licensed to transact such business in the State where the Work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these bonds shall be borne by the Contractor. If at any time a surety on any such Bond is declared bankrupt or loses its right to do business in the State in which the Work is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable Bond, (or Bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such Bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable Bond to the Owner.

26. ASSIGNMENTS

Neither the Contractor nor the Owner shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party.

27. INDEMNIFICATION

27.1 The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the

performance of the Work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury or to destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

- 27.2 In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Workmen's Compensation Acts, disability benefit acts or other employee benefits acts.
- 27.3 The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

28. SEPARATE CONTRACTS

- 28.1 The Owner reserves the right to let other contracts in connection with this Project. The Contractor shall afford the Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate his Work with theirs. If the proper execution or results of any part of the Contractor's Work depends upon the Work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such Work that render it unsuitable for such proper execution and results.
- 28.2 The Owner may perform additional Work related to the Project by himself, or he may let other contracts containing provisions similar to these. The Contractor will afford the other Contractors who are parties to such Contracts (or the Owner, if he is performing the additional Work himself) reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work, and shall properly connect and coordinate his work with theirs.
- 28.3 If the performance of additional Work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written

notice thereof shall be given to the Contractor prior to starting any such additional Work. If the Contractor believes that the performance of such additional Work by the Owner or others involves him in additional expense or entitles him to an extension of the Contract Time, he may make a claim therefor as provided in Sections 16 and 17.

29. SUBCONTRACTING

- 29.1 The Contractor may utilize the services of specialty Subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty Subcontractors.
- 29.2 The Contractor shall not award any Work to any Subcontractor without prior written approval of the Owner, which approval will not be given until the Contractor submits to the Owner a written statement concerning the proposed award to the Subcontractor, which statement will contain such information as the Owner may require.
- 29.3 The Contractor shall be fully responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of person directly or indirectly employed by him.
- 29.4 The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents in so far as applicable to the Work of Subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.
- 29.5 Nothing contained in this contract shall create any contractual relation between any Subcontractor and the Owner.
- 29.6 The Contractor will insert in any subcontracts the clauses contained in 29 CFR 5.5 (a) (1) through (5) and (7) and such other clauses and appropriate instructions as the Environmental Protection Agency may require, and also a clause requiring the Subcontractors to include these clauses in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

30. ENGINEER'S AUTHORITY

- 30.1 The Engineer shall act as the Owner's representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and Work performed. He shall interpret the intent of the Contract Documents in a fair and unbiased manner. The Engineer will make visits to the site and determine if the work is proceeding in accordance with the Contract Documents.
- 30.2 The Contractor will be held strictly to the intent of the Contract Documents in regard to the quality of material, workmanship and execution of the Work. Inspections may be made at the factory or fabrication plant of the source of material supply.
- 30.3 The Engineer will not be responsible for the construction means, control, techniques, sequences, procedures, or construction safety.
- 30.4 The Engineer shall promptly make decisions relative to interpretation of the Contract Documents.

31. LAND AND RIGHTS-OF-WAY

- 31.1 Prior to issuance of the Notice to Proceed, the Owner shall obtain all land and rights-of-way necessary for carrying out and for the completion of the Work to be performed pursuant to the Contract Documents, unless otherwise mutually agreed.
- 31.2 The Owner shall provide to the Contractor information which delineates and describes the lands owned and rights-of-way acquired.
- 31.3 The Contractor shall provide at his own expense without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

32. GUARANTEE

The Contractor shall guarantee all materials and equipment and work performed for a period of one (1) year after final acceptance by the Owner of all work at both plants. The Contractor warrants and guarantees during the guarantee period that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system

resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other Work that may be necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

33. ARBITRATION

33.1 All claims, disputes and other matters in question arising out of, or relating to, the Contract Documents or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 23, (Acceptance of Final Payment As Release), shall be decided by arbitration, if all parties mutually agree, in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. Any arbitration based on settlements or awards shall include the following information: (a) finding of fact, (b) allocation of award to each issue, (c) conclusion of law, (d) basis of award and rationale. The award rendered by the arbitrators shall be final, and judgement may be entered upon it in any court having jurisdiction thereof.

33.2 Notice of the demand for arbitration shall be filed in writing with the other party to the Contract Documents and with the American Arbitration Association, and a copy shall be filed with the Engineer. Demand for arbitration shall in no event be made on any claim, dispute or other matter in question which would be barred by the applicable statute of limitations.

33.3 The Contractor shall carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

34. TAXES

The Contractor shall pay all sales, consumer, use and other similar taxes required by laws of the State where the Work is performed, unless proper forms are acquired and submitted exempting the Contractor from such taxes.

35. USE OF PREMISES AND REMOVAL OF DEBRIS

35.1 The Contractor expressly undertakes at his own expense:

35.1.1 To take every precaution against injuries to persons or damage to

property;

35.1.2 To store his apparatus, materials, supplies, and equipment in such orderly fashion at the site of the Work as will not unduly interfere with the progress of his Work or the Work of any other Contractors;

35.1.3 To place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work;

35.1.4 To clean up frequently all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the Work shall present a neat, orderly and workmanlike appearance;

35.1.5 Before final payment, to remove all surplus material, falsework, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, and to put the site in a neat, orderly condition;

35.1.6 To effect all cutting, fitting or patching of his Work required to make the same to conform to the plans and specifications and, except with the consent of the Engineer, not to cut or otherwise alter the Work of any other Contractor.

36. QUANTITIES OF ESTIMATES

Whenever the estimated quantities of Work to be done and materials to be furnished on a unit price basis under this contract are shown in any of the documents including the proposal, they are given for use in comparing bids, and the right is expressly reserved, except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the Work contemplated by this contract, and such increase or diminution shall in no way vitiate this contract, nor shall any such increase or diminution give cause for claims or liability for damages.

37. CONFLICTING CONDITIONS

Any provision in any of the Contract Documents which may be in conflict or inconsistent with any of the paragraphs in these General Conditions shall be void to the extent of such conflict or inconsistency.

38. NOTICE AND SERVICE THEREOF

Any notice of any Contractor from the Owner relative to any part of this contract shall be in writing and considered delivered and the service thereof completed, when said notice is posted by certified or registered mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the Work.

39. REQUIRED PROVISIONS DEEMED INSERTED

39.1 Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party, the contract shall forthwith be physically amended to make such insertion or correction.

39.2 The Contractor agrees to abide by all local and state laws or ordinances to the extent that such requirements do not conflict with Federal Laws or regulations.

40. SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

In order to protect the lives and health of his employees under the contract, the Contractor shall comply with all pertinent provisions of the Contract Work Hours and Safety Standards Act as amended, and the Occupational Safety and Health Act of 1970 as amended, and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from Work, arising out of and in the course of employment of Work under the Contract.

The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation. He shall provide safety controls for protection of life and health of employees. The Contractor shall comply with all safety regulations of the State Department of Labor.

41. LABOR STANDARDS

The Contractor shall comply with the appropriate prevailing wage rates applicable to this project; they are contained in the Wage Rate Section of these Specifications.

42. INTEREST OF FEDERAL, STATE OR LOCAL OFFICIALS

No federal, state or local official shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

43. OTHER PROHIBITED INTEREST

No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiation, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the Project, shall become directly or indirectly interested personally in this contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the Project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the Project.

44. EXISTING UTILITIES

44.1 Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or by public or private utility companies.

44.2 With particular respect to existing underground utilities, the available information concerning their location has been shown on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy or adequacy of this information.

44.3 Before proceeding with the Work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the construction work. The purpose of the conference or conferences, shall be to notify said companies, agencies, or departments of the proposed construction schedule, verify the location of, and possible interference with, the existing utilities that are shown on the plans, arrange for necessary suspension of service and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the plans. The Engineer and Owner have no objection to the contractor arranging for the said utility companies, agencies, or departments to locate and

uncover their own utilities; however, the Contractor shall bear the entire responsibility for locating and avoiding or repairing damage to said existing utilities.

44.4 When the Contractor encounters any utilities not shown on the plans or in different location than shown on the plans and in conflict with the Work, he shall immediately notify the Engineer.

44.5 It is suggested that the Contractor locate all unknown metallic hazards, namely buried pipe, metals, etc by using a pipe locator. The pipe locator shall immediately precede the trench ditching and all hazard located and marked in such manner as to notify the machine operator of such hazard.

44.6 Where existing utilities or appurtenant structures, either underground or aboveground, are encountered, they shall not be displaced or molested unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. The Contractor will make all necessary utility relocations unless otherwise noted. Where new water lines, gas lines, or sewers are being installed to replace existing lines, the Contractor shall maintain the existing lines in service until new lines are in service or shall provide temporary utility service to affected customers at his expense.

44.7 It is expected that the Contractor will be diligent in his efforts and use every possible means to locate existing utilities. Any claims for unavoidable damage, based on improper or unknown locations, will be thoroughly examined in the light of the Contractor's efforts to locate the said utilities or obstructions prior to beginning construction.

45. STANDARD SPECIFICATIONS

Where standard specifications, such as those of the American Society for Testing Materials, the American Standards Association, the American Association of State Highway Officials, the Federal Aviation Agency, etc are referred to in the specifications and Contract Documents and on the plans, said references shall be construed to mean the latest amended and/or revised versions of the said standard or tentative specifications.

46. SANITARY FACILITIES

The Contractor shall furnish, install and maintain ample sanitary facilities for the workmen. As the needs arise, enclosed temporary toilets, in sufficient number, shall be placed as directed by the Engineer. Permanent toilets installed under this Contract

shall not be used during construction. Drinking water shall be provided from an approved safe source, so piped or transported as to be kept clean and fresh, and served from single service containers of satisfactory types.

47. SUPERVISION OF INSTALLATION

All major equipment and control systems shall be installed under the supervision of a qualified installation Engineer and/or representative furnished by the manufacturer of such equipment or control system.

48. AIR AND WATER POLLUTION CONTROL

The Contractor shall provide all materials, equipment, devices and work required to comply with air and water standards and to accomplish construction of the Project in a manner which will protect, enhance, and retrieve a favorable environment. The Contractor, at all times, shall observe and comply with all federal, state, possession, and local laws, codes, ordinances, and regulations governing air and water pollution control and the Contractor and his surety shall indemnify and save harmless the Owner and all his officers, agents, and servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decrees, whether by himself or his employees. The Contractor shall bear all expense of meeting and maintaining air and water standards, and any accessory features incidental to compliance without additional or direct compensation, except as otherwise specified. The Contractor shall take appropriate actions to minimize situation and soil erosion, control noise and limit odors during construction. No bypassing of wastewater will occur in conjunction with this contract without prior approval of the State Water Pollution Control Agency, and the United States Environmental Protection Agency.

49. USE OF CHEMICALS

All chemicals used during project construction or furnished for project operations, whether herbicide, pesticide, disinfectant, polymer, reactant, or of such classification, must show approval of either EPA or USDA. Use of all such chemicals shall be in conformance with instructions.

50. DAMAGE TO EXISTING LANDSCAPING, PAVEMENTS, STRUCTURES, SIDEWALKS, CURBS, ETC

The Contractor shall be responsible for replacing all lawns, trees, shrubs, fences, sidewalks, driveways, curbs, ditches, drainage structures, or other improvements both public and private which are damaged in carrying out the Work. Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental

shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing. Trees removed shall be replaced with trees of a like kind, 5'-6' in height as directed by the Engineer.

LABOR REGULATION

LR-1



Ernie Fletcher
Governor

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT OF LABOR
OFFICE OF WORKPLACE STANDARDS
1047 US Hwy 127 S STE 4
Frankfort, Kentucky 40601
Phone: (502) 564-3070
www.kylabor.net

LaJuana S. Wilcher
Secretary

Philip J. Anderson
Commissioner

Christopher H. Smith
Executive Director

December 22, 2005

Jeff Reynolds
HMB Professional Engineers, Inc.
3 HMB Circle
Frankfort KY 40601

Re: Bracken County Water District, Delisle Curve Water Line Project & Storage Tank

Advertising Date as Shown on Notification: December 29, 2005

Dear Jeff Reynolds:

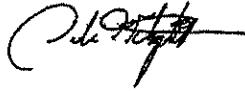
This office is in receipt of your written notification on the above project as required by KRS 337.510 (1).

I am enclosing a copy of the current prevailing wage determination number CR-1-020, dated May 18, 2005 for BRACKEN County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based upon the advertising date contained in your notification. There may be modifications to this wage determination prior to the advertising date indicated. In addition, if the contract is not awarded within 90 days of this advertising date or if the advertising date is modified, a different set of prevailing rates of wages may be applicable. It will be the responsibility of the public authority to contact this office and verify the correct schedule of the prevailing rates of wages for use on the project. Your project number is as follows: 012-H-00019-05-1, Heavy/Highway

Sincerely,

LR-2



John Fitzpatrick
Prevailing Wage Specialist
KENTUCKY DEPARTMENT OF LABOR
PREVAILING WAGE DETERMINATION
CURRENT REVISION
LOCALITY NO. 20

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

Determination No. CR-1-20 2005

Date of Determination: May 18, 2005

Project No. 012-H-00019-05-1 Type: ___ Bldg <u>XXX</u> HH
--

This schedule of the prevailing rate of wages for Bracken, Carter, Greenup, Lewis, Mason & Robertson Counties has been determined in accordance with the provisions of KRS 337.505 to 337.550. This determination shall be referred to as Prevailing Wage Determination No. CR-1-20 2005.

Apprentices shall be permitted to work as such subject to Administrative Regulations adopted by the Executive Director of Workplace Standards. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, and/or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one calendar day, but not more than ten (10) hours worked in any one calendar day, if such written agreement is prior to the over eight (8) hours in a calendar day actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked.

Fringe benefit amounts are applicable for all hours worked except when otherwise noted. Welders will receive rate for craft in which welding is incidental.

NOTE: The type of construction shall be determined by applying the following definitions:

BUILDING CONSTRUCTION

Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

HIGHWAY CONSTRUCTION

Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.



Philip J. Anderson, Commissioner
Kentucky Department of Labor



Christopher H. Smith, Executive Director
Office of Workplace Standards
Kentucky Department of Labor

Ratified September 28, 2005

Determination No. CR-1-20 2005

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, MASON & ROBERTSON COUNTIES:

ASBESTOS/INSULATION WORKERS:

Asbestos/Insulation Workers: (Includes application of all insulating materials, protective coverings, coating and finishing to all types of mechanical systems):

BASE RATE \$22.72
FRINGE BENEFITS 9.75

Hazardous Material Handlers: (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems):

BASE RATE \$19.60
FRINGE BENEFITS 7.00

CARTER, GREENUP & LEWIS COUNTIES:

ASBESTOS/INSULATION WORKERS:

Asbestos/Insulation Workers: (Includes application of all insulating materials, protective coverings, coating and finishing to all types of mechanical systems):

BASE RATE \$26.10
FRINGE BENEFITS 11.74

Hazardous Material Handlers: (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems):

BASE RATE \$18.25
FRINGE BENEFITS 6.18

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

BOILERMAKERS:

BASE RATE \$31.29
FRINGE BENEFITS 15.67

BRACKEN, MASON & ROBERTSON COUNTIES:

BRICKLAYERS:

Bricklayers, Caulkers & Cleaners:

BASE RATE \$24.41
FRINGE BENEFITS 8.14

Refractory: BUILDING

BASE RATE \$24.91
FRINGE BENEFITS 8.14

Marble Setters, Terrazzo Workers, & Tile Setters:

BUILDING

BASE RATE \$25.92

FRINGE BENEFITS 7.34

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, LEWIS & MASON COUNTIES:

MARBLE FINISHERS:

Finishers:

BUILDING

BASE RATE \$21.48

FRINGE BENEFITS 7.34

Marble Sanders, Polishers, Waxers & Sawyers:

BUILDING

BASE RATE \$21.55

FRINGE BENEFITS 7.34

Terrazzo Base Grinders (While operating base grinding machine):

BUILDING

BASE RATE \$21.90

FRINGE BENEFITS 7.34

CARTER, GREENUP & LEWIS COUNTIES:

BRICKLAYERS:

Bricklayers, Caulkers, Cleaners, Marble Setters, Pointers, Stonemasons, Terrazzo Workers, & Tile Setters:

BASE RATE \$24.46

FRINGE BENEFITS 9.93

CARTER & GREENUP COUNTIES:

MARBLE FINISHERS:

Marble, Terrazzo & Tile Finishers:

BUILDING

BASE RATE \$19.09

FRINGE BENEFITS 4.96

Terrazzo Base Grinders:

BUILDING

BASE RATE \$19.51

FRINGE BENEFITS 4.96

Marble Sanders & Polishers:

BUILDING

BASE RATE \$19.16

FRINGE BENEFITS 4.96

BRACKEN COUNTY:

CARPENTERS:

Carpenters & Piledrivermen: (Does not include Walls/Ceiling Work):

BUILDING

BASE RATE \$19.22

FRINGE BENEFITS 4.77

Carpenters & Lathers: (Walls & Ceiling work only):
BUILDING

BASE RATE \$18.99
FRINGE BENEFITS 4.98

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN COUNTY:

CARPENTERS (Continued):

Carpenters:	HEAVY & HIGHWAY	BASE RATE	\$22.85
		FRINGE BENEFITS	7.23
Piledrivermen:	HEAVY & HIGHWAY	BASE RATE	\$23.10
		FRINGE BENEFITS	7.23
Divers:	HEAVY & HIGHWAY	BASE RATE	\$34.65
		FRINGE BENEFITS	7.23

CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

CARPENTERS:

Carpenters: (Soft Floor Layers)	BUILDING	BASE RATE	\$23.92
		FRINGE BENEFITS	9.44
Carpenters	HEAVY & HIGHWAY	BASE RATE	\$22.85
		FRINGE BENEFITS	7.23
Piledrivermen:	BUILDING	BASE RATE	\$24.32
		FRINGE BENEFITS	9.44
	HEAVY & HIGHWAY	BASE RATE	\$23.10
		FRINGE BENEFITS	7.23
Divers:	HEAVY & HIGHWAY	BASE RATE	\$34.65
		FRINGE BENEFITS	7.23

BRACKEN & ROBERTSON COUNTIES:

CEMENT MASON:	BUILDING	BASE RATE	\$20.70
		FRINGE BENEFITS	7.05

CARTER, GREENUP, LEWIS & MASON COUNTIES:

CEMENT MASON; PLASTERER:	BUILDING	BASE RATE	\$25.64
--------------------------	----------	-----------	---------

Groundman:	BUILDING	BASE RATE	\$15.28
		FRINGE BENEFITS	11.50

CLASSIFICATIONS **RATE AND FRINGE BENEFITS**

ROBERTSON COUNTY:

ELECTRICIANS:

Electricians:		BASE RATE	\$25.75
		FRINGE BENEFITS	9.52

LINE CONSTRUCTION:

Cable Splicer:		BASE RATE	\$26.75
		FRINGE BENEFITS	7.90

Equipment Operator A: John Henry Rock Drill, D6 (or equivalent) and above, Trackhoe Digger, Cranes (greater than 25 tons and less than 45 tons):

	BASE RATE	\$23.63
	FRINGE BENEFITS	7.41

Equipment Operator B: Cranes (6-25 tons), Backhoes, Road Tractor, Dozer up to D5, Pressure Digger-Wheeled or Tracked, all Tension Wire Stringing Equipment:

	BASE RATE	\$21.00
	FRINGE BENEFITS	7.16

Equipment Operator C: Trencher, Vibratory Compactor, GroundRod Driver, Boom Truck (6 ton or below), Skid Steer Loaders:

	BASE RATE	\$17.06
	FRINGE BENEFITS	6.39

Groundman:		BASE RATE	\$19.69
		FRINGE BENEFITS	6.80

Lineman and Technician:		BASE RATE	\$26.25
		FRINGE BENEFITS	7.82

Cranes 45 tons or larger paid 100% of journeyman lineman's rate.

GREENUP, LEWIS & MASON COUNTIES:

ELECTRICIANS:

Electricians:		BASE RATE	\$25.75
		FRINGE BENEFITS	9.52

SOUND & COMMUNICATIONS:

Installer:		BASE RATE	\$18.95
------------	--	-----------	---------

FRINGE BENEFITS 6.69

Cable Puller:

BASE RATE \$10.01
FRINGE BENEFITS 6.21

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

ELEVATOR MECHANICS:

BASE RATE \$26.255
FRINGE BENEFITS 7.455

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

GLAZIERS:

BUILDING

BASE RATE \$24.81
FRINGE BENEFITS 4.10

BRACKEN, MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Morganburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington) & ROBERTSON COUNTIES:

IRONWORKERS:

Structural, & Ornamental:

BASE RATE \$24.00
FRINGE BENEFITS 11.58

Fence Erector:

BASE RATE \$22.05
FRINGE BENEFITS 11.58

Reinforcing:

Beyond 30-mile radius of Hamilton County, OH Courthouse

BASE RATE \$22.96
FRINGE BENEFITS 10.47

Up to and including 30-mile radius of Hamilton County, OH Courthouse

BASE RATE \$22.71
FRINGE BENEFITS 10.47

CARTER, GREENUP, LEWIS & MASON (Eastern third, including the Townships of Helena, Marshall, Orangeburg, Plumville & Springdale) COUNTIES:

IRONWORKERS:

Up to 10-mile radius of Union Hall, Ashland Kentucky:

BASE RATE \$25.67
FRINGE BENEFITS 11.57

10 to 50 mile radius of Union Hall, Ashland Kentucky:

BASE RATE \$26.07
FRINGE BENEFITS 11.57

50 mile radius & over of Union Hall, Ashland Kentucky:

BASE RATE \$28.07
FRINGE BENEFITS 11.57

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN & MASON COUNTIES:

LABORERS/BUILDING:

GROUP 1:

Asbestos Abatement, Carpenter Tender, General, Concrete Pouring & Curing, Concrete Form Stripping & Wrecking, Hand Digging & Backfilling of Ditches, Clearing of Right-of-ways & Building Sites, Wood Sheeting & Shoring, Signalperson for Concrete Bucket, General Cleaning, Toxic Waste Removal, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level D:

BUILDING BASE RATE \$17.33
FRINGE BENEFITS 6.58

GROUP 2:

Air Tool Operator, Air Track Drill, Asphalt Raker, Tamper, Batch Plant & Scale Man, Chain Saw, Concrete Saw, Electric Hand Grinder, Electric Bush & Chipping Hammer, Flagperson, Forklift Operator, Form Setter (Street or Highway), Gunnite, Hand Spiker, Introflox Burning Rod, Joint Maker, Mason Tender, Pipelayer, Plasterer Tender, Power Driven Georgia Buggy, Power Posthole Digger, Railroad, Sandblaster, Scow Man & Deck Hand, Signalperson, Sweeper & Cleaner Machine, Vibrator Operator, Walk Behind Trenching Machine, Mortar Mixer Machine, Water Pumpman, Metal Form Setter, Heater, Mesh Handler on walkways, streets & roadway (Outside Buildings), & Environmental Laborers – Nuclear, Radiation, Toxic & Hazardous Waste – Level C:

BUILDING BASE RATE \$17.73
FRINGE BENEFITS 6.58

GROUP 3:

Gunnite Nozzleman & Gunnite Nozzle Machine Operator, Sand Blaster Nozzleman, Concrete or Grout Pumpman, & Plaster Pumpman:

BUILDING BASE RATE \$17.93
FRINGE BENEFITS 6.58

GROUP 4:

Powderman & Blaster, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level B:

BUILDING BASE RATE \$18.03
FRINGE BENEFITS 6.58

GROUP 5:

Caisson Hole (6 ft. & over – Pressure & Free Air including Tools), Construction Specialist, Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level A:

BUILDING BASE RATE \$18.53
FRINGE BENEFITS 6.58

GROUP 6:

Tunnel Man & Tunnel Sand Miner, Cofferdam (Pressure & Free Air), & Sand Hog or Mucker (Pressure or Free Air), & Sand Hog or Mucker (Pressure or Free Air):

BUILDING	BASE RATE	\$18.83
	FRINGE BENEFITS	6.58

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

ROBERTSON COUNTY:

LABORERS/BUILDING:

GROUP 1:

Asbestos Abatement, Carpenter Tender, General, Concrete Pouring & Curing, Concrete Form Stripping & Wrecking, Hand Digging & Backfilling of Ditches, Clearing of Right-of-ways & Building Sites, Wood Sheeting & Shoring, Signalperson for Concrete Bucket, General Cleaning, Toxic Waste Removal, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level D:

BUILDING	BASE RATE	\$15.00
	FRINGE BENEFITS	6.56

GROUP 2:

Air Tool Operator, Air Track Drill, Asphalt Raker, Tamper, Batch Plant & Scale Man, Chain Saw, Concrete Saw, Electric Hand Grinder, Electric Bush & Chipping Hammer, Flagperson, Forklift Operator, Form Setter (Street or Highway), Gunnite, Hand Spiker, Introlax Burning Rod, Joint Maker, Mason Tender, Pipelayer, Plasterer Tender, Power Driven Georgia Buggy, Power Posthole Digger, Railroad, Sandblaster, Scow Man & Deck Hand, Signalperson, Sweeper & Cleaner Machine, Vibrator Operator, Walk Behind Trenching Machine, Mortar Mixer Machine, Water Pumpman, Metal Form Setter, Heater, Mesh Handler on walkways, streets & roadway (Outside Buildings), & Environmental Laborers – Nuclear, Radiation, Toxic & Hazardous Waste – Level C:

BUILDING	BASE RATE	\$15.40
	FRINGE BENEFITS	6.56

GROUP 3:

Gunnite Nozzlemans & Gunnite Nozzle Machine Operator, Sand Blaster Nozzlemans, Concrete or Grout Pumpman, & Plaster Pumpman:

BUILDING	BASE RATE	\$15.60
	FRINGE BENEFITS	6.56

GROUP 4:

Powderman & Blaster, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level B:

BUILDING	BASE RATE	\$15.70
	FRINGE BENEFITS	6.56

GROUP 5:

Caisson Hole (6 ft. & over – Pressure & Free Air including Tools), Construction Specialist, Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level A:

BUILDING	BASE RATE	\$16.20
	FRINGE BENEFITS	6.56

GROUP 6:

Tunnel Man & Tunnel Sand Miner, Cofferdam (Pressure & Free Air), & Sand Hog or Mucker (Pressure or Free Air), & Sand Hog or Mucker (Pressure or Free Air):

BUILDING	BASE RATE	\$16.50
	FRINGE BENEFITS	6.56

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

CARTER, GREENUP & LEWIS COUNTIES:

LABORERS/BUILDING:

GROUP 1:

General, Carpenter Tender, Cement Finisher Tender, Concrete Man, Wrecker, Handler of Empty Oxygen & Acetylene Bottles, & Environmental Laborer:

BUILDING	BASE RATE	\$21.80
	FRINGE BENEFITS	8.58

GROUP 2:

Deck & Scow Man:

BUILDING	BASE RATE	\$21.90
	FRINGE BENEFITS	8.58

GROUP 3:

Hod Carrier, Mortar Man, & Plasterer Tender:

BUILDING	BASE RATE	\$21.95
	FRINGE BENEFITS	8.58

GROUP 4:

Wrapping, Heating & Applying Hot & Cold Tar on all Pipes, Applying Tape on Pipes, & Operation of Tester:

BUILDING	BASE RATE	\$21.97
	FRINGE BENEFITS	8.58

GROUP 5:

Jackhammer, Power Tools (Electrical, Gas, or Air Power), Burning Torch, Wagon Drill Operator, Tile Layer, Handling of Creosote Material, Signperson, & Asphalt Raker:

BUILDING	BASE RATE	\$22.05
	FRINGE BENEFITS	8.58

GROUP 6:

Rock & Powder Man:

BUILDING	BASE RATE	\$22.30
	FRINGE BENEFITS	8.58

GROUP 7:

Sand Hog & Mucker:

BUILDING	BASE RATE	\$22.50
	FRINGE BENEFITS	8.58

GROUP 8:

Caisson Worker:

BUILDING	BASE RATE	\$23.00
	FRINGE BENEFITS	8.58

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

LABORERS HEAVY/HIGHWAY:

GROUP 1:

Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental – Nuclear, Radiation, Toxic & Hazardous Waste – Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; & Wrecking of Concrete Form & General Cleanup:

HEAVY & HIGHWAY BASE RATE \$17.43
FRINGE BENEFITS 8.38

GROUP 2:

Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Burner & Welder; Bushhammer; Chain Saw Operator; Hand Held or Walk Behind Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental – Nuclear, Radiation, Toxic & Hazardous Waste – Level C; Forklift Operator for Masonry; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; & Wagon Driller:

HEAVY & HIGHWAY BASE RATE \$17.68
FRINGE BENEFITS 8.38

GROUP 3:

Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditch; Screw Operator; Tunnel (Free air); & Water Blaster:

HEAVY & HIGHWAY BASE RATE \$17.73
FRINGE BENEFITS 8.38

GROUP 4:

Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Driller (all types); Powderman & Blaster; Troxler & Concrete Tester if Laborer is Utilized:

HEAVY & HIGHWAY BASE RATE \$18.33
FRINGE BENEFITS 8.38

BRACKEN COUNTY:

MILLWRIGHTS:

BASE RATE \$21.90
FRINGE BENEFITS 7.92

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

MILLWRIGHTS:	BASE RATE	\$27.33
	FRINGE BENEFITS	9.99

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

OPERATING ENGINEERS: BUILDING:

Auto Patrol, Batcher Plant, Bituminous Paver, Cableway, Central Compressor Plant, Clamshell, Concrete Mixer (21 cu. ft. or over), Concrete Pump, Crane, Crusher Plant, Derrick, Derrick Boat, Ditching & Trenching Machine, Dragline, Dredge, Dredge Engineer, Elevating Grader and all types of Loaders, Hoe Type Machine, Hoist (1 drum when used for stack or chimney construction or repair), Hoisting Engine (2 or more Drums), Locomotive, Motor Scrapper, Carry-All Scoop, Bulldozer, Mechanic, Orangepeel Bucket, Piledriver, Power Blade, Motor Grader, Roller (Bituminous), Scarifier, Shovel, Tractor Shovel, Truck Crane, Winch Truck, Push Dozer, Highlift, Forklift (Regardless of lift height & except when used for masonry construction), Boom Cat, Core Drill, Hopto, Tow or Push Boat, A-Frame Winch Truck, Concrete Paver, Gradeall, Hoist, Hyster, Pumpcrete, Ross Carrier, Boom, Tail Boom, Rotary Drill, Hydro Hammer, Mucking Machine, Rock Spreader (Attached to Equipment), Scoopmobile, KeCal Loader, Tower Crane (French, German & Other Types), Hydrocrane, Backfiller, Gurry, Subgrader, Tunnel Mining Machine, including Moles, Shield or similar types of Tunnel Mining Equipment:

BUILDING	*BASE RATE	\$22.89
	FRINGE BENEFITS	9.65

Cable Crane (50 tons and over), Hydraulic Crane (100 tons and over):

BUILDING	*BASE RATE	\$23.50
	FRINGE BENEFITS	9.65

***Crane with boom 150 feet and over, including jib, shall received \$.50 above Base Rate, Cranes with CCO required shall receive \$.10 above Base Rate.**

Air Compressor (Over 900 cu. ft. per min.), Bituminous Mixer, Joint Sealing Machine, Concrete Mixer (under 21 cu. ft.), Form Grader, Roller (Rock), Tractor (50 h.p. and Over), Bull Float, Finish Machine, Outboard Motor Boat, Flexplane, Fireperson, Boom Type Tamping Machine, Truck Crane Oiler, Greaser on Grease Facilities servicing heavy equipment, Switchman or Brakeman, Whirley Oiler, Self-propelled Compactor, Tractair & Road Widening Trencher & Farm Tractor with attachments, except Backhoe, Highlift & Endloader, Elevator (When used for hoisting any building materials), Hoisting Engine (1 Drum or Buck Hoist), Forklift (When used for masonry construction, firebrick masonry excluded), Well Points, Grout Pump, Throttle-Valve Man, Tugger, & Electric Vibrator Compactor:

BUILDING	BASE RATE	\$19.56
	FRINGE BENEFITS	9.65

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

OPERATING ENGINEERS: BUILDING: (Continued)

Bituminous Distributor, Cement Gun, Conveyor, Mud Jack, Paving Joint Machine, Roller (Earth), Tamping Machine, Tractor (Under 50 H.P.), Vibrator, Oiler, Concrete Saw, Burlap & Curing Machine, Hydro Seeder, Power Form Handling Equipment, Deckhand Steersman, & Hydraulic Post Driver:

BUILDING	BASE RATE	\$18.61
	FRINGE BENEFITS	9.65

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

OPERATING ENGINEERS: HEAVY HIGHWAY:

CLASS A:

A-Frame Winch Truck; Auto Patrol; Backfiller; Batcher Plant; Bituminous Paver; Bituminous Transfer Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-all Scoop; Carry Deck Crane; Central Compressor Plant; Clamshell; Concrete Mixer (21 cu. ft. or Over); Concrete Paver; Truck-Mounted Concrete Pump; Core Drill; Crane; Crusher Plant; Derrick; Derrick Boat; Ditching & Trenching Machine; Dragline; Dredge Operator; Dredge Engineer; Elevating Grader & Loaders; Grade-All; Gurries; Heavy Equipment Robotics Operator/Mechanic; High Lift; Hoe-Type Machine; Hoist (Two or More Drums); Hoisting Engine (Two or More Drums); Horizontal Directional Drill Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau; Locomotive; Mechanic; Mechanically Operated Laser Screed; Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel Bucket; Piledriver; Power Blade; Pumpcrete; Push Dozer; Rock Spreader, attached to equipment; Rotary Drill; Roller (Bituminous); Scarifier; Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Telescoping Type Forklift; Tow or Push Boat; Tower Crane (French, German & other types); Tractor Shovel; Truck Crane; Tunnel Mining Machines, including Moles, Shields or similar types of Tunnel Mining Equipment:

HEAVY & HIGHWAY	*BASE RATE	\$22.15
	FRINGE BENEFITS	10.40

CLASS B:

Air Compressor (Over 900 cu. ft. per min.); Bituminous Mixer; Boom Type Tamping Machine; Bull Float; Concrete Mixer (Under 21 cu. ft); Dredge Engineer; Electric Vibrator; Compactor/Self-Propelled Compactor; Elevator (One Drum or Buck Hoist); Elevator (when used to Hoist Building Material); Finish Machine; Firemen & Hoist (One Drum); Flexplane; Forklift (Regardless of Lift Height); Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Concrete Pump; Switchman or Brakeman; Throttle Valve Person; Tractair & Road Widening Trencher; Tractor (50 HP or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler:

HEAVY & HIGHWAY	*BASE RATE	\$19.73
	FRINGE BENEFITS	10.40

CLASS B2:

Greaser on Grease Facilities servicing Heavy Equipment:

HEAVY & HIGHWAY	*BASE RATE	\$20.11
	FRINGE BENEFITS	10.40

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

OPERATING ENGINEERS: (Continued)

HEAVY HIGHWAY:

CLASS C:

Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steersman; Tamping Machine; Tractor (Under 50 HP); & Vibrator:

HEAVY & HIGHWAY *BASE RATE \$19.47
FRINGE BENEFITS 10.40

*Cranes with booms 150 ft. & over (including jib) \$1.00 premium. Employees assigned to work below ground level are to be paid 10% above basic wage rate. This does not apply to open cut work.

BRACKEN, MASON & ROBERTSON COUNTIES:

PAINTERS: BUILDING ONLY:

Brush, Roller, Paperhanging & Taping:

BUILDING BASE RATE \$21.30
FRINGE BENEFITS 5.90

Spray:

BUILDING BASE RATE \$21.80
FRINGE BENEFITS 5.90

Sandblasting, Waterblasting, & Hopper Tender:

BUILDING BASE RATE \$22.05
FRINGE BENEFITS 5.90

Hazardous Work, High Work, Elevated Tanks 40 Feet or Above, & Lead Abatement Projects:

BUILDING BASE RATE \$22.30
FRINGE BENEFITS 5.90

Sandblasting, Hopper Tender & Waterblasting Under Hazardous Conditions:

BUILDING BASE RATE \$23.05
FRINGE BENEFITS 5.90

HEAVY/HIGHWAY ONLY

Elevated Tanks:

HEAVY & HIGHWAY BASE RATE \$22.30
FRINGE BENEFITS 5.90

BRIDGES – GUARDRAILS – LIGHTPOLES – STRIPING:

Bridge/Equipment Tender and/or Containment Builder:

HEAVY & HIGHWAY BASE RATE \$18.90

FRINGE BENEFITS 5.90

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, MASON & ROBERTSON COUNTIES:

PAINTERS HEAVY/HIGHWAY ONLY: (Continued)

Brush & Roller:	HEAVY & HIGHWAY	BASE RATE	\$21.30
		FRINGE BENEFITS	5.90

Spray:	HEAVY & HIGHWAY	BASE RATE	\$21.80
		FRINGE BENEFITS	5.90

Sandblasting & Hopper Tender, Water Blasting:	HEAVY & HIGHWAY	BASE RATE	\$22.05
		FRINGE BENEFITS	5.90

Bridges when highest point of clearance is 60 feet or more, & Lead Abatement Projects:	HEAVY & HIGHWAY	BASE RATE	\$22.30
		FRINGE BENEFITS	5.90

Sandblasting, Hopper Tender, Waterblasting (Bridges when highest point of clearance is 60 feet or more):	HEAVY & HIGHWAY	BASE RATE	\$23.05
		FRINGE BENEFITS	5.90

CARTER, GREENUP & LEWIS COUNTIES:

PAINTERS:	BUILDING	BASE RATE	\$20.47
		FRINGE BENEFITS	9.90

Bridges:	HEAVY & HIGHWAY	BASE RATE	\$24.61
		FRINGE BENEFITS	10.40

All Other Work:	HEAVY & HIGHWAY	BASE RATE	\$20.47
		FRINGE BENEFITS	9.90

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

PAINTERS:

Sign Painter & Erector:	BUILDING	BASE RATE	\$17.57
		FRINGE BENEFITS	4.55

CLASSIFICATIONS**RATE AND FRINGE BENEFITS****BRACKEN & ROBERTSON COUNTIES:**

PLASTERERS:	BASE RATE	\$20.65
	FRINGE BENEFITS	7.25

BRACKEN, MASON & ROBERTSON COUNTIES:

PIPEFITTERS & PLUMBERS:	BASE RATE	\$26.27
	FRINGE BENEFITS	10.49

CARTER, GREENUP & LEWIS COUNTIES:

PLUMBERS & STEAMFITTERS:	BASE RATE	\$26.20
	FRINGE BENEFITS	11.70

BRACKEN & ROBERTSON COUNTIES:

ROOFERS (excluding sheetmetal):

Roofers:	BASE RATE	\$24.12
	FRINGE BENEFITS	7.62

Pitch:

	BASE RATE	\$25.12
	FRINGE BENEFITS	7.62

CARTER, GREENUP, LEWIS & MASON COUNTIES:

ROOFERS (excluding sheetmetal):	BASE RATE	\$25.35
	FRINGE BENEFITS	5.70

BRACKEN & ROBERTSON COUNTIES:

SHEETMETAL WORKERS (including metal roofs):	BASE RATE	\$27.62
	FRINGE BENEFITS	10.66

CARTER, GREENUP, LEWIS & MASON COUNTIES:

SHEETMETAL WORKERS (including metal roofs):	BASE RATE	\$23.12
	FRINGE BENEFITS	11.49

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

SPRINKLER FITTERS:	BASE RATE	\$25.05
--------------------	-----------	---------

FRINGE BENEFITS 11.00

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, MASON & ROBERTSON COUNTIES:

TRUCK DRIVERS/BUILDING:

3 Tons & Under, Greaser, Tire Changer, & Mechanic Tender:

BUILDING	BASE RATE	\$17.52
	FRINGE BENEFITS	8.04

Over 3 Tons, Semi-Trailer or Pole Trailer, Dump Tandem Axles, Farm Tractor (When used to pull building material & equipment):

BUILDING	BASE RATE	\$17.63
	FRINGE BENEFITS	8.04

Concrete Mixer (Hauling on jobsites), & Truck Mechanic:

BUILDING	BASE RATE	\$17.70
	FRINGE BENEFITS	8.04

Euclid's & Other Heavy Moving Equipment, Lowboy, Winch, A-Frame & Monorail Truck (To transport building materials):

BUILDING	BASE RATE	\$17.80
	FRINGE BENEFITS	8.04

Building Truck Drivers on hazardous or toxic waste sites, add \$4.00 to base rate.

CARTER, GREENUP & LEWIS COUNTIES:

TRUCK DRIVERS/BUILDING:

Pickup, Station Wagon, Panel, Flatboy Material Truck (Straight job), Dump (Up to 5 cu. yds.):

BUILDING	BASE RATE	\$24.59
	FRINGE BENEFITS	9.81

Tank (Straight), Dump (5 cu. yds. & over), Agitator or Mixer (Up to 5 cu. yds.), & Flat Bed Tandem:

BUILDING	BASE RATE	\$24.97
	FRINGE BENEFITS	9.81

Winch, Fork, Distributor (Front End and Back End), Truck Crane, & Monorail:

BUILDING	BASE RATE	\$25.78
	FRINGE BENEFITS	11.30

Agitator or Mixer (5 cu. yds. & Over):

BUILDING	BASE RATE	\$25.20
	FRINGE BENEFITS	9.81

CLASSIFICATIONSRATE AND FRINGE BENEFITS

TRUCK DRIVERS/BUILDING: (Continued)

CARTER, GREENUP & LEWIS COUNTIES:

Mechanic, Tri-Axle Dump, Hydraulic Lift Tailgate, Truck & Farm-type Tractor, End Dumpster, Turnrocker, Ross Carrier, Athey Wagon, Semi-dump, Semi-trailer, Semi-tank, & Lowboy Trailer:

BUILDING	BASE RATE	\$25.61
	FRINGE BENEFITS	9.81

Master Mechanic:

BUILDING	BASE RATE	\$25.97
	FRINGE BENEFITS	9.81

TRUCK DRIVERS HEAVY/HIGHWAY

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

Mobile Batch Truck Tender:	HEAVY & HIGHWAY	BASE RATE	\$16.57
		FRINGE BENEFITS	7.34

Greaser, Tire Changer, & Mechanic Tender:

HEAVY & HIGHWAY	BASE RATE	\$16.68
	FRINGE BENEFITS	7.34

Single Axle Dump & Flatbed; Semi-Trailer or Pole Trailer when used to pull building materials & equipment; Tandem Axle Dump; Distributor; Mixer & Truck Mechanic:

HEAVY & HIGHWAY	BASE RATE	\$16.86
	FRINGE BENEFITS	7.34

Euclid, Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat Truck, 5 Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Forklift when used to transport building materials; & Pavement Breaker:

HEAVY & HIGHWAY	BASE RATE	\$16.96
	FRINGE BENEFITS	7.34

END OF DOCUMENT CR-1-20 2005

Page 19 of 19

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called PRINCIPAL and
(Corporation, Partnership, or Individual)

(Name of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, and unto all persons, firms and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns in the total aggregate penal sum of _____ Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the _____ day of _____, 20 __, a copy of which is hereto attached and made a part hereof for the construction of: _____

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in prosecution of the WORK provided for in such contract, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall

be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the SPECIFICATIONS.

PROVIDE FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL shall have given written notice to any two of the following: the PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (B) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, is being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

WITNESS WHEREOF, this instrument is executed in _____ counterparts, each of which
Number

shall be deemed an original, this the _____ day of _____.

ATTEST:

(Principal) Secretary

(SEAL)

Principal

By _____

(Address)

Witness as to Principal

(Address)

Surety

ATTEST:

Witness as to Surety

(Address)

By _____

Attorney-in-Fact

(Address)

NOTE: Date of BOND must not be prior to date of CONTRACT.

If CONTRACTOR is partnership, all partners should execute BOND. IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the total aggregate penal sum of _____
_____ Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____ 20 _____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the one year guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract shall include any alteration, addition, extension, or modification of any character whatsoever.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one
Number

of which shall be deemed an original, this the _____ day of _____.

ATTEST:

(Principal) Secretary

(SEAL)

Principal

By _____ (s)

(Witness as to Principal)

(Address)

(Address)

Surety

ATTEST:

Witness to Surety

By _____
Attorney-in-Fact

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

CONTRACT AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 20____

by and between _____
(Owner)

acting through its _____ hereinafter
called (Mayor, Utility Commission, Chairmen)

the OWNER and _____ doing business as
(Contractor)

_____ of the city of _____
(an individual) (partnership) (a corporation)

_____, County, State of _____

hereinafter called the CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

The CONTRACTOR will commence and complete the construction of

The CONTRACTOR will furnish all of the materials, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein.

The CONTRACTOR will commence work under this contract on or before the date to be specified by the Owner, in a written "Notice to Proceed" and will fully complete the project within _____ consecutive calendar days thereafter. The CONTRACTOR further agrees to pay as liquidated damages, the sum of \$_____ For each consecutive calendar day that the work remains uncomplete after the expiration date of this contract, as modified by Change Order.

The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS for the sum of \$_____, or as shown in the Bid Schedule, Pages BS _____ thru BS _____.

The term "CONTRACT DOCUMENTS" means and includes the following: SPECIFICATIONS prepared or issued by HMB Professional Engineers, Inc.

<u>TITLE</u>	<u>DESIGNATION</u>
Advertisement for Bids	<u>AD</u>
Instructions to Bidders	<u>IB</u>
General Conditions	<u>GC</u>
Labor Regulations	<u>LR</u>
Performance and Payment Bond	<u>PB</u>
Contract Agreement	<u>CON</u>
Notice of Award	<u>NA</u>
Notice to Proceed	<u>NP</u>
Change Order Format	<u>CO</u>
Special Conditions	<u>SC</u>
Technical Specifications	<u>TS</u>
Bid Schedule	<u>BS</u>

DRAWINGS prepared by HMB Professional Engineers, Inc. numbered _____ through _____ and dated _____.

The following ADDENDA are included as part of this Contract:

ADDENDUM NO. _____

DATE

The OWNER shall make progress payments as the work is completed, in accordance with the appropriate Articles of the General Conditions.

Final payment shall be due thirty (30) days after completion and acceptance of the work.

Before issuance of final certificate, the Contractor shall submit evidence satisfactory to the Owner that all payrolls, material bills, and other indebtedness connected with the work have been paid.

If, after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and the Engineer so certifies, the Owner shall, upon certificate of the Engineer and without terminating the contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in _____ copies each of which shall be deemed an original on the date first above written.

This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

CONTRACTOR

ATTEST:

Title
(SEAL)

By _____
Title

ATTEST:

OWNER

Title

By _____
Title

NOTICE OF AWARD

TO: _____

PROJECT Description _____

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____ 20 _____, and Instructions to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____, in accordance with the Bid Schedule.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Contractor's Performance Bond and Payment Bond within ten calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said bonds within ten days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 20 _____.

Owner
By _____
Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by

_____ this the _____ of _____, 20 _____.

Contractor

Title

NOTICE TO PROCEED

TO _____

DATE: _____
PROJECT: _____

You are hereby notified to commence work in accordance with the Agreement dated _____, 20 _____, on or before _____, 20 _____, and you are to complete the WORK within _____ consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 20 _____.

OWNER
By _____
Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by _____, this the _____ day of _____, 20 _____.

By _____
Title _____

CONTRACT CHANGE ORDER

ORDER NO.

DATE

STATE

CONTRACT FOR

COUNTY

OWNER

To: _____
 (Contractor)

You are hereby requested to comply with the following changes from the contract plans and specifications:

Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
	\$ _____	\$ _____
TOTALS	\$ _____	\$ _____
NET CHANGE IN CONTRACT PRICE	\$ _____	\$ _____

JUSTIFICATION:

The Original amount of the Contract is: _____ Dollars (\$ _____).

The amount of the current Contract including previous Change Orders: _____ Dollars (\$ _____).

The amount of the Contract will be (Increased Decreased) by this Change Order the sum of _____ Dollars (\$ _____).

The Contract Total including this and previous Change Orders will be: _____ Dollars (\$ _____).

The Contract period provided for completion will be increased: _____ Days

This document will become a supplement to the contract and all provisions will apply hereto.

Requested _____
 (Owner)

 (Date)

Recommended _____
 (Owner's Architect/Engineer)

 (Date)

Accepted _____
 (Contractor)

 (Date)

Approved By _____
 (Name and Title)

 (Date)

This information will be used as a record of any changes to the original construction contract.

SPECIAL CONDITIONS

1. PROJECT FUNDING

Contractors bidding the project should be aware that funding is provided by a KIA Tobacco Grant and KRWA Loan.

2. PROJECT INSPECTION

The Inspection services shall be provided by the Engineer. The Inspector shall be on the project at all times; however, due to meetings, etc. there may be times when he is not with the crew. Therefore, the Contractor shall not backfill any water main and/or appurtenances until the Inspector has seen it.

3. PRIORITY OF CONSTRUCTION

The Contractor shall proceed from the beginning point of a line and/or road and start installing water line and appurtenances and placing sections of line in service continuing to the end of the line. Jumping or skipping around laying scattered sections of water lines shall not be permitted. When a road is completed, cleanup must commence immediately. The Owner will hold payment on sections due to skipping; the intent is to proceed toward the end of the line, hooking up as many customers as is possible. Priority by road is as follows:

- | | |
|--|---|
| 1) Master Meter Vault | 2) Booster Pump Station |
| 3) Upgrade Ky 1019 | 4) Upgrade Eden Ridge |
| 5) Ky 1951 | 6) Snag Creek |
| 7) Willow Creek | 8) Ky 1019 to Power Line |
| 9) Power Line towards Holts Cr. | 10) Holts Creek |
| 11) "AA" Highway (North) | 12) North Kennon Ln. |
| 13) Carntown Road | 14) Cochran Road |
| 15) Salem Ridge Extension | 16) Upgrade Ky 875 |
| 17) Cross County (Ky 875 to Cottey Rdg.) | 18) Cotty Ridge |
| 19) D. Howard Road | 20) D. Mains Road |
| 21) Cotty Rdg. To Hillsdale Road | 22) Cross County (Cotty Rdg. to Danghe Rd.) |
| 23) Danghe & Rice Road | 24) Upgrade Ky 10 (Danghe to Brooksville) |
| 25) Fronk's Lane (Add-On Road) | |

4. DOT PERMIT COMPLIANCE

Contractor should take note of typical items required by DOT. The Contractor shall be responsible for complying with the various items listed in the DOT permit. See Appendix A-DOT Permit.

5. COUNTY ROAD PERMIT

Contractor should take note of the items required as part of the County Road Permit (Appendix B - County Road Permit). The Contractor shall be responsible for complying with the various items listed in the permit. This includes the following:

- a. Obtaining a bond equal to \$20,000 to secure adequate repairs are made.
- b. Video taping all areas involving County roads prior to construction and providing the Fiscal Court and the Engineer with a copy.
- c. Any case involving the road surface or within 2 feet there of, all excavation will be filled with flowable fill.

6. UNCLASSIFIED EXCAVATION

All excavation is unclassified, no extra payment will be allowed for solid rock excavation. It is the Contractor's responsibility to make any additional investigations.

7. CONFLICTING SECTIONS/STATEMENTS IN THE TECHNICAL SPECIFICATIONS

It shall be noted that if any provision in these Technical Specifications is in conflict and/or is inconsistent with any other section or provision in the Appendices (Bracken County Water District-Standard Specifications), then the most stringent shall apply per the interpretation of the ENGINEER.

8. FEDERAL/STATE/LOCAL REGULATIONS

The Contractor shall abide by all local and state laws or ordinances to the extent that such requirements do not conflict with federal laws or regulations.

9. SILTATION AND SOIL EROSION

The Contractor shall make every effort during construction to minimize siltation and soil erosion.

10. ROUGH CLEAN UP

- a. Rough clean up shall be performed on a daily basis concurring with the daily rate of production for pay items, amounts and/or quantities listed in the schedule of values.

- b. The Contractor is to provide sufficient labor and equipment for clean up as to not impede production schedules.
- c. Rough clean up shall be defined as follows:
 - 1. All open ditches shall be backfilled on a daily basis.
 - 2. Debris (rocks, roots, timber, etc.) shall be removed from the job site on a daily basis. This material may be stockpiled with the consent of the owner and the engineer in designated locations.
 - 3. Remaining backfill material (soil) shall be windrowed back on top of the ditch line, compacted and leveled giving consideration for settlement.
- d. At the direction of the engineer or his/her appointed representative, the Contractor shall readdress areas if identified as not being adequate in the initial rough clean process.

11. PROJECT PHOTOGRAPHY

The Contractor shall video tape each work area prior to beginning any construction. The audio portion of the video shall indicate the line being shown and the location along the line with addresses. The video shall show conditions of the adjacent properties prior to construction work beginning. These tapes shall be used to resolve any disputes with property owners.

The Contractor shall maintain one copy of each tape at his office and supply the Engineer and the Bracken County Water District with one copy of each tape in VHS format. Each tape shall be labeled with the name of the city, the contract number and a reference number. A list of the contents of each tape shall also be submitted correlating with the reference number. *Absolutely no construction will be permitted until video taping is completed and the District and the Engineer are supplied with copies of the video.*

12. QUANTITIES OF MATERIALS

The quantities of materials listed on the Bid Schedule are estimates only. The Contractor shall verify these quantities before ordering materials. In the event of an under run or over run of materials, the Contractor shall be responsible for any shipping and/or restocking fees.

13. PROJECT REQUIREMENTS

All Contractors bidding this project should be aware of the following requirements; while not all inclusive, the list is representative of those items that will be enforced by the Engineer during this project.

- A. Installation of Trace Wire-Contractor to install #14 AWG THWN Insulated Copper Wire along all water main. Trace Wire shall be attached to the top of pipe. Tracer wire shall also be run up into meter boxes and valve boxes. All splices shall be made with an approved splicing device.
- B. METER SETTER: MUELLER 5/8 x 3/4 w/qtr turn ball valve and built in backflow device (ex. B-2404-2A). Setter shall be lockable. (Compression x FIP)
- C. TANDEM SETTER: MUELLER w/qtr turn ball valve and built in backflow device. Setter shall be lockable. (Compression x FIP)
- D. PRESSURE REGULATOR for tandem setter: WILKINS #600-7LU and shall include the necessary fittings and "S" tube and shall be installed in setter .
- E. SETTER FITTINGS: District's side: MUELLER 110 compression; Customer side: MUELLER H14222-6670.
- F. TAPPING SADDLES: MUELLER brass series S-1300. with CORP STOPS: MUELLER H15008/9.
- G. IF SELF-TAPPING USED: DRESSER series 294 for PVC or DRESSER series 193 for A/C.
- H. METERS: BADGER Positive displacement w/recordall registers.
- I. MAIN LINE CONTROL VALVES: PRV's, flow control valves, altitude valves etc. shall be BERMAD.
- J. TELEMETRY: Micro-Comm RTU's (By Owner)
- K. GATE VALVES: R.S. MUELLER series A2360.
- L. METER BOXES: 18" diameter ribbed green with a maximum length of 24". Meter setter shall be installed so that meter shut-off valve will be between 20" and 24" below the finished grade, unless other types or depth are approved by OWNER.

- M. METER LIDS: Raised type w/small pent nut with omni fit lid.
- N. MASTER METER: BADGER Turbo with integrated strainer and meter test port and shall have the capability of the addition of an RTR for remote read or control of pumps.
- O. Pump Station(s) meter(s) shall be BADGER TURBO with remote electronic register for use of pump control and remote read.
- P. When existing customer services are being changed to new line, the old service shall be either shut-off at corp stop or an approved termination device must be used (valve cap, plug, etc.). Crimping line is not sufficient.
- Q. All gate valves on branch line of tees and fire hydrant tees shall be mechanically restrained in addition to thrust blocking and shall be sized appropriately for the line used.
- R. All hydrants shall have appropriate sized valves before the hydrant.
- S. The top of ALL valve bonnets shall be a minimum of 18" below finished grade. COMPLETE valve box assemblies shall be installed at each valve with the correct lid for the type of valve and shall be flush with finished grade. All operating valves shall be no lower than 4.5" below finished grade.
- T. Complete valve boxes assembly shall be used on each valve. Valve box shall be at finish grade level with approved reinforced concrete collars around boxes. All lids shall fit correctly on the valve box.
- U. Each hydrant shall be at the correct depth recommended by the manufacturer and no outlet connection shall be closer than 18" to finished grade. All hydrants shall be preceded by an inline valve correctly sized to the inlet of the hydrant.
- V. All customer meters that are re-located shall be on customer side of new main. No looping service under or over main.
- W. Where meter vaults installed they shall be so designed that the line entering and exiting the vault shall be 18" minimum from the bottom of the vault and minimum of 30" below finish grade. All vaults shall be so constructed to have good drainage and manhole lid or hatch shall be large enough to allow the removal of the meters or pumps but shall be a minimum of 36" and shall be lockable shall be a minimum of 24" and lockable.

SECTION 01010
Summary of Work

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Work to be performed under this Contract shall consist of furnishing all labor, materials, tools, equipment and incidentals and performing all Work required to construct complete in place and ready to operate:
1. 143,700 L.F. of Various Size Water Line and Appurtenances
 2. 300 GPM Booster Pump Station and Appurtenances
- B. All Work described above shall be performed as shown on the Drawings and as specified.

1.2 PROJECT LOCATION

The equipment and materials to be furnished will be installed at the locations shown on the Drawings.

1.3 QUANTITIES

The Owner reserves the right to alter the quantities of work to be performed or to extend or shorten the improvements at any time when and as found necessary, and the Contractor shall perform the work as altered, increased or decreased. Payment for such increased or decreased quantity will be made in accordance with the Instructions to Bidders. No allowance will be made for any change in anticipated profits nor shall such changes be considered as waiving or invalidating any conditions or provisions of the Contract and Bond.

END OF SECTION

SECTION 01016

Occupancy

PART 1 GENERAL

1.1 PARTIAL OCCUPANCY BY OWNER

Whenever, in the opinion of the Engineer, any section or portion of the Work or any structure is in suitable condition, it may be put into use upon the written order of the Engineer and such usage will not be held in any way as an acceptance of said Work or structure, or any part thereof, or as a waiver of any of the provisions of these Specifications and the Contract. Pending final completion and acceptance of the Work, all necessary repairs and replacements, due to defective materials or workmanship or operations of the Contractor, for any section of the Work so put into use shall be performed by the Contractor at Contractor's own expense.

END OF SECTION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 01041
Project Coordination

PART 1 GENERAL

1.1 SCOPE

- A. Management of the Project shall be through the use of a logical method of construction planning, inspection, scheduling and cost value documentation.
- B. The work under this Section includes all surface and subsurface condition inspections and coordination by the Contractor necessary for the proper and complete performance of the Work.
- C. This Section applies to the work of every division and every section of these Specifications.

1.2 SITE CONDITIONS

A. Inspection

- 1. Prior to performing any work under a section, the Contractor shall carefully inspect the installed work of other trades and verify that all such work is complete to the point where the work under that section may properly commence.
- 2. The Contractor shall verify that all materials, equipment and products to be installed under a section may be installed in strict accordance with the original design and pertinent reviewed shop drawings.

B. Discrepancies

- 1. In the event of discrepancy, immediately notify the Engineer.
- 2. Do not proceed with construction in areas of discrepancy until all such discrepancies have been fully resolved.

1.3 COORDINATION

- A. Carefully coordinate work with all other trades and subcontractors to insure proper and adequate interface of the work of other trades and subcontractors with the work of every section of these Specifications.

- B. The Contractor shall coordinate operations with all utility companies in or adjacent to the area of Contractor's work. The Contractor shall require said utilities to identify in the field their property and provide drawings as necessary to locate them.

END OF SECTION

PART 1 GENERAL

- 1.1 The CONTRACTOR shall provide all necessary labor, materials, tools, equipment, insurances, and permits, etc., and perform all other related work, as may be required for the work in accordance with the applicable terms of these Specifications and other pertinent documents, etc.
- 1.2 The cost associated with the preparation of submittal and the preparation for and attendance at all project meetings shall be incidental to the work.
- 1.3 Items shown in the plan but not expressly described herein shall be considered incidental to the work.
- 1.4 Lump sum items shall be paid upon completion and acceptance of all work covered by the item. However, CONTRACTOR may submit an application for partial payment of lump sum items. Such application shall be in writing and shall define and provide justification for desired break down of the lump sum items. The application will be reviewed by the ENGINEER in a timely manner and any concerns will be discussed with the CONTRACTOR prior to issuing written agreement with the partial payment scheme. It is recommended that Partial Payment Applications be submitted and approval sought prior to the submission of the first invoice for the project.
- 1.5 The quantities shown are estimated. Only the actual quantities required, furnished, and installed and/or removed, will be eligible for payment. No minimum(s) is/are guaranteed.
- 1.6 The CONTRACTOR will NOT be paid for any items herein in excess of the estimated quantities or for any items not contained in the proposal(s) unless the CONTRACTOR has obtained WRITTEN authorization from the ENGINEER before proceeding with the work.
- 1.7 The various phases of contractual work that are required to complete the subject project must be performed in a most expeditious manner and to the satisfaction of the ENGINEER.

PART 2 PAY ITEMS

2.1 WATER LINES

- A. Measurement - Measurement for the length of pipe to be included for payment at the unit prices bid shall be the actual length laid in the trench measured along the centerline of the pipe and including the lengths of and fittings in the line. Measurement shall begin at the ends of existing pipes, valves or fittings to which the new pipe is connected or such other point as may be designated on the plans.
- B. Payment - Payment for installing only water pipe lines complete will be made at the contract unit price bid per linear foot for water pipe of the various sizes and classifications. No pay item has been established for fittings or restraint joints. These

Measurement and Payment

are considered incidental and shall be included in the unit price bid per linear foot for water pipe. Payment for installing water pipe shall constitute full compensation for

trenching, installation of pipe and tracer wire, backfill, disinfecting and testing for the water line, together with other incidental and related work necessary for the completion of the water main installation except that valves, valve boxes, pavement replacement and such other items shall be paid for separately, if included as a pay item on the bid proposal.

2.2 VALVES

- A. Measurement - Valves will be measured by actual count on each size and type of valve installed in the completed system.
- B. Payment - Payment for installing only valves of the various sizes and classifications, accessories, adapters, extension stems, valve boxes with lids, concrete collar or other required appurtenances, shall be made on the basis of the contract unit prices bid. Such payment shall constitute full compensation for installing the valves complete in full accordance with the Plans and Specifications.

2.3 ROCK EXCAVATION

Excavation is unclassified, therefore, separate measurement or payment will not be made.

2.4 BITUMINOUS/CONCRETE PAVEMENT REPLACEMENT

- A. Measurement - Measurement for pavement replacement shall be equal to the length of the pavement installed, as measured along the centerline of the water main. Minimum width shall be equal to the nominal pipe diameter plus 3'-6" centered over the pipeline. For pavement replacement on State or Federal Highways where concrete base is required, the minimum width will be increased to 7'-6".
- B. Payment - Payment for pavement replacement shall be made on the basis of the unit prices bid for various classifications of pavements indicated in the proposal form. Such payment shall constitute full compensation for furnishing all labor, material, and equipment and replacing the damaged pavement, including the crushed stone base and crushed stone backfill as required. The CONTRACTOR is advised that although the limits of payment shall be as described under paragraph A, above he shall be responsible for replacing all pavement damaged during construction, at no additional cost, so that the paved area is left in a condition as good as or better than before the start of construction.

Payment for pavement replacement shall also include compensation for providing temporary pavement patches as required by the specifications and for maintaining the patches until such time as the permanent pavement is placed inasmuch as no separate payment will be made for this work.

2.5 CRUSHED STONE

- A. Measurement - Measurement of crushed stone for payment shall be based on linear feet of gravel replaced on driveways. This item will be paid for based upon amount disturbed and only a one time payment. Crushed stone used for bedding water mains in rock excavation or in backfill around fire hydrants and valves shall not be measured for payment. Payment shall be included in the unit price for pipe, valves or fire hydrant.

Crushed stone used as base material or backfill for pavement replacement also will not be measured for payment inasmuch as payment for this material will be included in the payment for pavement replacement.

- B. Payment - Payment for crushed stone, measured as provided above, which payment shall constitute full compensation for furnishing, hauling, placing and compacting the stone as specified.

2.6 CASING PIPE BY BORE & JACK

- A. Measurement - Measurement of casing pipe installed under pavement, railroad tracks, structures or other places by bore and jack shall be by the linear foot and shall be the centerline length of the casing installed and accepted.

- B. Payment - Payment shall be made on the basis of the contract unit price bid for various diameters. This price shall constitute payment for furnishing and installing casing pipe by boring and jacking and spacers; including all labor, tools and equipment. Payment for the water line to be installed in the casing pipe shall be paid for at applicable unit price bid.

2.7 CONNECTIONS TO EXISTING LINES

No additional compensation will be made for connections to existing lines as shown on drawings. Only those items employed in such connections and appear in this Section will be paid for separately.

2.8 STANDARD BLOW-OFF

- A. Measurement - Standard blow-offs shall be sized as shown on plans and include gate valve, restraints and fittings. This item will be measured by an actual count of blow-offs installed, tested, sterilized and accepted.

- B. Payment - Standard blow-off assemblies, installed and accepted will be paid for on the basis of the unit price per each and payment shall constitute full compensation for furnishing, hauling, installing complete, testing and sterilizing, for excavation, preparation of bed and backfilling, and for the furnishing of all equipment, tools and incidentals necessary to complete the item.

Measurement and Payment**2.9 FIRE HYDRANTS / FLUSH HYDRANTS**

- A. **Measurement** - Measurement of hydrants for payment shall be made by actual count of type of hydrant provided in the completed installation.
- B. **Payment** - Payment for hydrants complete shall be based on the contract unit prices bid. Such payment shall constitute compensation in full for hydrants complete with the necessary barrel and stem extensions, concrete base and kicker, valve, valve box and the required crushed stone for drainage as shown in the standard details in drawing package.

2.10 AIR RELEASE VALVE ASSEMBLY

- A. **Measurement** - Air release valve assemblies will be measured by an actual count of each size and type installed and accepted. The unit price bid for this item shall include tapping the main saddle, corporation stop, bronze gate valve, air release valve, meter box and cover, crushed stone and other fittings as covered by Specifications and Plans.
- B. **Payment** - Air release valve assemblies installed and accepted will be paid on the basis of the unit price per each and payment shall constitute full compensation for furnishing all materials and supplies, and installing complete, testing, excavation and for the furnishing of all equipment, tools and incidentals necessary to complete the item.

2.11 TYPE "B" CREEK CROSSING

- A. **Measurement** - Measurement of creek crossing for payment shall be made by the actual length of creek crossing provided in the complete installation.
- B. **Payment** - Payment for installing creek crossing complete will be made at the contract unit price bid per linear foot. Payment for installing creek crossing shall constitute full compensation for fittings, trenching, concrete, casing pipe, spacers, backfill, disinfecting and testing together with other incidental and related work necessary for the completion of the creek crossing. Payment for the water line to be installed in the creek crossing shall be paid for at the applicable unit price.

2.12 TYPE "C" CREEK CROSSING

- A. **Measurement** - Measurement of "C" Creek Crossing for payment shall be made by the actual length of creek crossing provided in the complete installation
- B. **Payment** - Payment for installing creek crossing complete will be made at the contract unit price bid per linear foot. Payment for installing creek crossing shall constitute full compensation for water line or where indicated ball and socket water line, fittings, trenching, installation, backfill, concrete anchors, typical meter setting, disinfecting and testing together with other incidental and related work necessary for the completion of the creek crossing.

2.13 OPEN CUT WITH STEEL CASING OR PLASTIC CASING

- A. Measurement - Measurement of casing pipe installed by open cut shall be by the linear foot and shall be by the linear foot and shall be in the casing installed and accepted
- B. Payment - Payment shall be made on the basis of the contract unit price bid for the various diameters. The price shall constitute payment for furnishing and installing casing pipe by open cut and spacers; including all labor, tools, and equipment. Payment for the water line to be installed in the casing shall be paid for at applicable unit price bid.

2.14 FLOWABLE FILL CONCRETE

- A. Measurement - Measurement of flowable fill concrete for payment shall be based on linear feet installed in the trench measured along the centerline of the pipe.
- B. Payment - Payment for installing flowable fill concrete will be made at the contract unit price bid per linear foot. Payment for installing flowable fill concrete shall constitute full compensation for flowable fill concrete, sand, mechanical tamping and related work necessary to complete in accordance with the plans and specifications. Pavement replacement and gravel replacement shall be paid for separately.

2.15 GABION BASKET

- A. Measurement - Measurement for gabion baskets for payment shall be based on the cubic yard of stone installed in the basket
- B. Payment - Payment for installation of gabion baskets will be made at the contract unit price bid per cubic yard. Payment shall constitute full compensation for excavation, installation, backfill, baskets, stone, together with other incidental and related work necessary for completion.

2.16 LINE PLUGGING

- A. Measurement - Line plugs will be measured by actual count of plugs installed in the completed system.
- B. Payment - Payment for installing plug including concrete shall be made on the basis of the contract unit price bid. Such payment shall constitute full compensation for installing the plug complete in full accordance with the Plans and Specifications.

2.17 PUMP STATION

- A. Measurement - This is a Lump Sum Bid Item and measurement will not be required.
- B. Payment - Payment for the Pump Station shall be made on the basis of the Lump Sum Price Bid and shall constitute full compensation for all pumps, valves, fittings, piping,

Measurement and Payment

controls, heaters, fans, lights, concrete, gravel drive, site work, power pole as shown on the plans and described in the specifications complete in place.

2.18 SERVICE CONNECTIONS

- A. **Measurement** - Service connections will be measured by an actual count of each size and type of service installed, tested, disinfected and accepted. The unit price bid for this item shall include saddles, corporation stop, curb stops, yoke, meter, meter box, pressure regulator, as required, service tubing or copper service tubing, as required, etc., as covered by Specifications and Plans.
- B. **Payment** - Service connections assemblies placed and accepted, measured as provided above, will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing, hauling and installing complete, testing and disinfection, for excavation, preparation of bed and backfilling, and for the furnishing of all equipment, tools, and incidentals necessary to complete the item.

2.19 EXISTING SERVICE CONNECTION TO PROPOSED LINE

- A. **Measurement** - Existing service connections to proposed line will be measured by the actual count of each size and type of service installed, tested, disinfected and accepted. The unit price bid for this item shall include saddles, corporation stop, connection to exist service line, service tubing or copper service tubing, as required, etc., as covered by Specifications and Plans.
- B. **Payment** - Existing service connections to proposed line assemblies placed and accepted, measured as provided above, will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing, hauling and installing complete, testing and disinfection, for excavation, preparation of bed and backfilling, and for the furnishing of all equipment, tools, and incidentals necessary to complete the item.

2.20 SERVICE PIPE

- A. **Measurement** - Measurement for the length of service pipe used for service installatio included for payment at the unit prices bid shall be the actual length installed over and above the 10 feet and 70 feet of service tubing that is to be included in the price bid for meter settings and existing service connection to proposed line.
- B. **Payment** - Payment for installing only water service lines completed will be made at the contract unit price bid per linear foot for water service pipe of the various sizes, types and classifications. Payment for installing service pipe shall constitute full compensation for excavation, installation, backfill, disinfecting, testing and other incidentals and related work necessary for the completion of the bid item.

2.21. BORE & JACK UNCASSED

- A. Measurement - Measurement of bore & jack uncased installed under pavement, structures or other places shall be by the linear foot and be measured along the centerline of the water main.
- B. Payment - Payment shall be made on the basis of the contract unit price bid for various diameters. This price shall constitute payment for bore & jacking uncased; including all labor, tools and equipment. Payment for the waterline to be installed shall be paid for at applicable unit price bid.

2.22 MAINLINE PRESSURE REDUCING STATION

- A. Measurement - Measurement of mainline pressure reducing stations shall be made by actual count of mainline pressure reducing stations provided in the completed installation.
- B. Payment - Mainline pressure reducing stations, installed and accepted will be paid for on the basis of unit price bid. Payment shall constitute full compensation for valves, strainers, piping, fitting, and concrete vault with access hatch, as shown on plans and described in the specifications, complete in place.

2.23 MASTER METER

- A. Measurement - Measurement of master meter shall be made by actual count of master meters provided in the completed installation.
- B. Payment - Master meters, installed and accepted will be paid for on the basis of unit price bid. Payment shall constitute full compensation for valves, strainers, meters, check valves, piping, fitting, and concrete vault with access hatch, as shown on plans and described in the specifications, complete in place.

SECTION 01340

Shop Drawings, Product Data and Samples

PART 1 GENERAL

1.1 SCOPE

- A. The work under this Section includes submittal to the Engineer of shop drawings, product data and samples required by the various sections of these Specifications.
- B. Submittal Contents: The submittal contents required are specified in each section.
- C. The following forms shall be used for all major components of the work:
 - 1. Typical Maintenance Summary Form
 - 2. Notice of Start of Manufacturing
 - 3. Notice of Shipment of Equipment
 - 4. Notice of Schedule Impact

The forms are included at the back of this section.

- D. Definitions: Submittals are categorized as follows:
 - 1. Shop Drawings
 - a. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance curves, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawing is prepared.
 - b. Provide newly-prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated) or appropriate number of prints hereof, with name or preparer (firm name) indicated. The Contract Drawings shall not be traced or reproduced by any method for use as or in lieu of detail shop drawings. Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by the Engineer to be used in connection with the Work.

- c. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, specification section, schedule or room numbers shown on the Contract Drawings.
 - d. Minimum assembly drawings sheet size shall be 24 x 36-inches.
 - e. Minimum detail sheet size shall be 8-1/2 x 11-inches.
 - f. Minimum Scale:
 - (1) Assembly Drawings Sheet, Scale: 1-inch = 30 feet.
 - (2) Detail Sheet, Scale: 1/4-inch = 1 foot.
2. Product Data
- a. Product data includes standard printed information on materials, products and systems, not specially prepared for this Project, other than the designation of selections from among available choices printed therein.
 - b. Collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the Project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked and special coordination requirements.
3. Samples
- a. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work, both as complete units and as smaller portions of units of work, either for limited visual inspection or, where indicated, for more detailed testing and analysis.
 - b. Provide units identical with final condition of proposed materials or products for the work. Include "range" samples, not less than three units, where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where the Engineer's selection is required. Prepare samples to match the Engineer's sample where indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by the Engineer. Engineer will note

"test" samples, except as otherwise indicated, for other requirements, which are the exclusive responsibility of the Contractor.

4. Miscellaneous submittals related directly to the Work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the Work but not processed as shop drawings, product data or samples.

1.2 SPECIFIC CATEGORY REQUIREMENTS

- A. General: Except as otherwise indicated in the individual work sections, comply with general requirements specified herein for each indicated category of submittal. Submittals shall contain:
 1. The date of submittal and the dates of any previous submittals.
 2. The Project title.
 3. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.
 4. The Names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 5. Identification of the product, with the Specification section number, permanent equipment tag numbers and applicable Drawing No.
 6. Field dimensions, clearly identified as such.
 7. Relation to adjacent or critical features of the Work or materials.
 8. Applicable standards, such as ASTM or Federal Specification numbers.
 9. Notification to the Engineer in writing, at time of submissions, of any deviations on the submittals from requirements of the Contract Documents.

10. Identification of revisions on resubmittals.
11. An 8 x 3-inch blank space for Contractor and Engineer stamps.
12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the Work and of Contract Documents.
13. Submittal sheets or drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

1.3 ROUTING OF SUBMITTALS

A. Submittals and routine correspondence shall be routed as follows:

1. Supplier to Contractor (through representative if applicable)
2. Contractor to Engineer
3. Engineer to Contractor and Owner
4. Contractor to Supplier

1.4 ADDRESS FOR COMMUNICATIONS

Engineer: Haworth, Meyer & Boleyn, Inc.
 3 HMB Circle
 Frankfort, KY 40601
 (502) 695-9800 FAX (502) 695-9810

PART 2 PRODUCTS

2.1 SHOP DRAWINGS

- A. Unless otherwise specifically directed by the Engineer, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the Work.
- B. Submit all shop assembly drawings, larger than 11 x 17-inches, in the form of one reproducible transparency with two opaque prints or bluelines.

- C. Submit all shop drawings, 11 x 17-inches and smaller, in the form of six opaque prints or blueines.
- D. One reproducible for all submittals larger than 11 x 17-inches and no more than three prints of other submittals will be returned to the Contractor.

2.2 MANUFACTURER'S LITERATURE

- A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.
- B. Submit the number of copies which are required to be returned (not to exceed three) plus three copies which will be retained by the Engineer.

2.3 SAMPLES

- A. Samples shall illustrate materials, equipment or workmanship and established standards by which completed work is judged.
- B. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.
- C. Submit all samples in the quantity which is required to be returned plus one sample which will be retained by the Engineer.

2.4 COLORS

- A. Unless the precise color and pattern is specifically described in the Contract Documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.
- B. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

PART 3 EXECUTION

3.1 CONTRACTOR'S COORDINATION OF SUBMITTALS

- A. Prior to submittal for the Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:

1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.
 2. Coordinate as required with all trades and all public agencies involved.
 3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this Section.
 4. Clearly indicate in a letter or memorandum on the manufacturer's or fabricator's letterhead, all deviations from the Contract Documents.
- B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement.
- C. The Owner may backcharge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a "No Exceptions Taken" mark.
- D. **Grouping of Submittals**
1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items.
 2. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to the Engineer along with Contractor's comments as to compliance, non-compliance or features requiring special attention.
- E. **Schedule of Submittals:** Within 30 days of Contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the estimated date of submittal and the desired approval date for each shop drawing anticipated. A reasonable period shall be scheduled for review and comments. Time lost due to unacceptable submittals shall be the Contractor's responsibility and some time allowance for resubmittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.2 TIMING OF SUBMITTALS

- A. **Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.**
- B. **In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal.**

3.3 REVIEWED SHOP DRAWINGS

A. Engineer Review

1. **Allow a minimum of 14 days for the Engineer's initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Engineer on each submittal as to whether processing time is critical to progress of the Work, and therefore the Work would be expedited if processing time could be foreshortened.**
2. **Acceptable submittals will be marked "No Exceptions Taken". A minimum of three copies will be retained by the Engineer for Engineer's and the Owner's use and the remaining copies will be returned to the Contractor.**
3. **Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Contractor may order, fabricate and ship the items included in the submittals, provided the indicated corrections are made. Drawings must be resubmitted for review and marked "No Exceptions Taken" prior to installation or use of products.**
4. **Submittals marked "Amend and Resubmit" must be revised to reflect required changes and the initial review procedure repeated.**
5. **The "Rejected - See Remarks" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.**
6. **Only two copies of items marked "Amend and Resubmit" and "Rejected - See Remarks" will be reviewed and marked. One copy will be retained by**

the Engineer and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.

- B. No work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.
- C. Substitutions: In the event the Contractor obtains the Engineer's approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor's own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.
- D. Use of the "No Exceptions Taken" notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer's review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

3.4 RESUBMISSION REQUIREMENTS

- A. Shop Drawings
 - 1. Revise initial drawings as required and resubmit as specified for initial submittal, with the resubmittal number shown.
 - 2. Indicate on drawings all changes which have been made other than those requested by the Engineer.
- B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with the resubmittal number shown.

END OF SECTION TEXT

FORMS FOLLOW

TYPICAL MAINTENANCE SUMMARY FORM

1. EQUIPMENT ITEM _____
2. MANUFACTURER _____
3. EQUIPMENT IDENTIFICATION NUMBER(S) _____
4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____
5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____
6. MANUFACTURER'S LOCAL REPRESENTATIVE
- Name _____ Telephone No. _____
- Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation	Frequency	Lubricant (If Applicable)	Comments
List briefly each maintenance operation req'd and refer to specific information in mfr's std. maintenance manual, if applicable.	List req'd frequency of each maintenance operation.	Refer by symbol to lubricant req'd.	

8. LUBRICANT LIST

Reference Symbol	Shell	Std. Oil	Gulf	Arco	Or Equal
List symbols used in Item 7. above.	List equivalent lubricants, as distributed by each Manufacturer for the specific use recommended.				

9. SPARE PARTS. Include your recommendations regarding what spare part, if any, should be kept on the job.

NOTICE OF START OF MANUFACTURING

DATE: _____

TO: _____

ATTENTION: _____

RE: Equipment Contract No. _____

Name of Contract: _____

Type of Equipment: _____

Quantity: _____

Scheduled Completion of Assembly: _____

Scheduled Date of Shipment: _____

NOTE: Delay to the above schedule which will affect shipment date by 5 days or more must be reported on the Schedule Impact form.

By: _____ Date: _____

Title: _____

ACTUAL MANUFACTURING AGENT:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

NOTICE OF SHIPMENT OF EQUIPMENT

DATE: _____

TO: _____

ATTENTION: _____

RE: Equipment Contract No. _____

Name of Contract: _____

Type of Equipment Being Shipped: _____

QTY. DESCRIPTION (Include Equipment Numbers) **SERIALS** (If Applicable):

ATTACH BILL(S) OF LADING FOR ALL SHIPMENTS TO THIS FORM

Date of Shipment: _____

By: _____

Title: _____

ACTUAL MANUFACTURING AGENT:

Name: _____

01340-12

Shop Drawings, Product Data and Samples

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

NOTICE OF SCHEDULE IMPACT

(Send this form to the Owner and Engineer if delay is over 5 days)

DATE: _____

TO: _____

ATTENTION: _____

RE: Equipment Contract No. _____

Name of Contract: _____

Type of Equipment Affected: _____

Nature of Delay: _____

New Estimated Date for Final Shop Drawings: _____

New Estimated Date for Start of Manufacture: _____

New Estimated Date for Finish Manufacture: _____

New Estimated Date for Shipment: _____

New Estimated Date for Arrival at Jobsite: _____

By: _____

Title: _____

ACTUAL MANUFACTURING AGENT:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

SECTION 01562

Dust Control

PART 1 GENERAL

1.1 SCOPE

Limit blowing dust caused by construction operations by applying water or employing other appropriate means or methods to maintain dust control, subject to the approval of the Owner. As a minimum, this may require the use of a water wagon twice a day to suppress dusty conditions.

1.2 PROTECTION OF ADJACENT PROPERTY

- A. The Bidders shall visit the site and note the buildings, landscaping, roads, parking areas and other facilities near the Work site that may be damaged by their operations. The Contractor shall make adequate provision to fully protect the surrounding area and will be held fully responsible for all damages resulting from Contractor's operations.

- B. Protect all existing facilities (indoors or out) from damage by dust, fumes, spray or spills (indoors or out). Protect motors, bearings, electrical gear, instrumentation and building or other surfaces from dirt, dust, welding fumes, paint spray, spills or droppings causing wear, corrosion, malfunction, failure or defacement by enclosure, sprinkling or other dust palliatives, masking and covering, exhausting or containment.

END OF SECTION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 01610

Transportation and Handling

PART 1 GENERAL

1.1 SCOPE

- A. The Contractor shall provide transportation of all equipment, materials and products furnished under these Contract Documents to the Work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the Work.
- B. All equipment, materials and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the Work.

1.2 TRANSPORTATION

- A. All equipment shall be suitably boxed, crated or otherwise protected during transportation.
- B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.
- C. Small items and appurtenances such as gauges, valves, switches, instruments and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.3 HANDLING

- A. All equipment, materials and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.
- B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.

Transportation and Handling

- C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.
- D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

END OF SECTION

SECTION 01630
Substitutions and Options

PART 1 GENERAL

1.1 SCOPE

This Section outlines the restrictions and requirements for substitutions, product and manufacturer options, and construction method options.

1.2 DEFINITIONS

A. For the purposes of these Contract Documents, a "substitute item" shall be defined as one of the following:

1. A product or manufacturer offered as a replacement to a specified product or manufacturer.
2. A product or manufacturer offered in addition to a specified product or manufacturer.

B. For the purposes of these Contract Documents, a "substitute construction method" shall be defined as one of the following:

1. A mean, method, technique, sequence or procedure of construction offered as a replacement for a specified mean, method, technique, sequence or procedure of construction.
2. A mean, method, technique, sequence or procedure of construction offered in addition to a specified mean, method, technique, sequence or procedure of construction.

1.3 GENERAL

A. An item or construction method, which is offered where no specific product, manufacturer, mean, method, technique, sequence or procedure of construction is specified or shown on the Drawings, shall not be considered a substitute and shall be at the option of the Contractor, subject to the provisions in the Contract Documents for that item or construction method.

B. For products specified only by a referenced standard, the Contractor may select any product by any manufacturer, which meets the requirements of the Specifications, unless indicated otherwise in the Contract Documents.

Substitutions and Options

- C. If the manufacturer is named on the Drawings or in the Specifications as an acceptable manufacturer, products of that manufacturer meeting all requirements of the Specifications and Drawings are acceptable.
- D. Whenever the Engineer's design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or listed first in the list of approved manufacturers in the Specifications. Any Bidder intending to furnish products of other than the first listed manufacturer, or furnish substitute items, shall
 - 1. Verify that the item being furnished will fit in the space allowed, perform the same functions and have the same capabilities as the item specified.
 - 2. Include in its Bid the cost of all accessory items which may be required by the other listed substitute product,
 - 3. Include the cost of any architectural, structural, mechanical, piping, electrical or other modifications required, and
 - 4. Include the cost of required additional work by the Engineer, if any, to accommodate the item.

1.4 APPROVALS

- A. Approval, of a substitution as an acceptable manufacturer, of the Engineer is dependent on determination that the product offered
 - 1. is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, service life and other criteria to that on which the design is based, and
 - 2. will require no major modifications to structures, electrical systems, control systems or piping systems.

1.5 SUBSTITUTIONS AND OPTIONS

- A. See Bid Schedule for allowance of substitutions.
- B. After Notice to Proceed
 - 1. Substitute items will be considered for acceptable manufacturers in the Specification.

2. Where items are specified by referenced standard or specified as indicated in Article 1.3, Paragraph A. above, such items shall be submitted to the Engineer for review.
 3. The Contractor shall submit shop drawings on the substitute item for the Engineer's review in accordance with the Section 01340.
- C. Prior to Opening of Bids
1. No consideration or approvals will be made for products specified by a referenced standard, or specified as indicated in Article 1.3, Paragraph A. above. Such consideration may occur only after the Notice to Proceed.
 2. No consideration or approvals will be made for products being offered where the term "equal to" precedes the name of an approved product. Such substitution consideration may occur only after the Notice to Proceed.

END OF SECTION

SECTION 01710

Cleaning

PART 1 GENERAL

1.1 SCOPE

This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

1.2 QUALITY ASSURANCE

- A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.
- B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.3 HAZARDOUS MATERIAL AND WASTE

- A. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in WFPA approved landfills as applicable.
- B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.
- C. Burning or burying rubbish and waste materials on the site shall not be allowed.
- D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.

1.4 DISPOSAL OF SURPLUS MATERIALS

Unless otherwise shown on the Drawings, specified or directed, the Contractor shall legally dispose off the site all surplus materials and equipment from demolition and shall provide suitable off-site disposal site, or utilize a site designated by the Owner.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

Use only the cleaning materials, methods and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 EXECUTION

3.1 PROGRESS CLEANING

A. General

1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this Work.
2. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Restack materials stored on site weekly.
3. At all times maintain the site in a neat and orderly condition which meets the approval of the Engineer.

C. Structures

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by using a hand-held broom.
3. As required preparatory to installation of successive materials, clean the structures or pertinent portions as recommended by the manufacturer of the successive material.
4. Following the installation of finish floor materials, clean the finish floor daily. "Clean", for the purpose of this paragraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Engineer, may be injurious to the finish floor material.
5. Schedule cleaning operation so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

3.2 FINAL CLEANING

- A. **Definitions:** Unless otherwise specifically specified, "clean" for the purpose of this Article shall be interpreted as the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.
- B. **General:** Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 3.01 above.
- C. **Site:** Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.
- D. **Structures**
 1. Remove all traces of soil, waste material, splashed material, and other foreign matter to provide a uniform degree of exterior cleanliness. Visually inspect all exterior surfaces and remove all traces of soil, waste material, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of

stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.

2. Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges and other foreign matter. Remove all paint droppings, spots, stains and dirt from finished surfaces.
 3. Clean all glass inside and outside.
 4. Polish all surfaces requiring the routine application of buffed polish. Provide and apply polish as recommended by the manufacturer of the material being polished.
- E. **Post-Construction Cleanup:** All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, as directed by the Engineer.
- F. **Restoration of Landscape Damage:** Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. The Engineer will decide what method of restoration shall be used.
- G. **Timing:** Schedule final cleaning as approved by the Engineer to enable the Owner to accept the Project.

3.3 CLEANING DURING OWNER'S OCCUPANCY

Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Engineer in accordance with the Supplementary Conditions of the Contract Documents.

END OF SECTION

SECTION 01720
Record Documents

PART 1 GENERAL

1.1 SCOPE

- A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording and submitting of project record documents as herein specified.
- B. Record documents include, but are not limited to:
 - 1. Drawings;
 - 2. Specifications;
 - 3. Change orders and other modifications to the Contract;
 - 4. Engineer field orders or written instructions, including Requests for Information (RFI) and Clarification Memorandums;
 - 5. Reviewed shop drawings, product data and samples;
 - 6. Test records.
- C. The Contractor shall maintain on the Project site throughout the Contract Time an up to date set of Record Drawings.

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Storage
 - 1. Store documents and samples in the Contractor's field office, apart from documents used for construction.
 - 2. Provide files and racks for storage of documents.
 - 3. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with format of these Specifications.

C. Maintenance

1. Maintain documents in a clean, dry, legible condition and in good order.
2. Do not use record documents for construction purposes.
3. Maintain at the site for the Owner one copy of all record documents.

D. Make documents and samples available at all times for inspection by Engineer.

E. Failure to maintain the Record Documents in a satisfactory manner may be cause for withholding of a certificate for payment.

1.3 QUALITY ASSURANCE

A. Unless noted otherwise, Record Drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.

B. Unless noted otherwise, Record Drawings shall provide elevations to the nearest 0.01 foot for all pertinent items constructed by the Contractor.

1.4 RECORDING

A. Label each document "PROJECT RECORD" in neat, large printed letters.

B. Recording

1. Record information concurrently with construction progress.
2. Do not conceal any work until required information is recorded.

1.5 RECORD DRAWINGS

A. Record Drawings shall be reproducible, shall have a title block indicating that the drawings are Record Drawings, the name of the company preparing the Record Drawings, and the date the Record Drawings were prepared. The Contractor will be provided paper sepias of the Drawings, or it may elect to provide reproducible drawings via another method. Reproducible shall be defined as being translucent so as to allow a blueline print to be produced.

B. Legibly mark drawings to record actual construction, including:

1. All Construction
 - a. Changes of dimension and detail.

- b. Changes made by Requests for Information (RFI), field order, clarification memorandums or by change order.
 - c. Details not on original Drawings.
2. Site Improvements, Including Underground Utilities
- a. Horizontal and vertical locations of all exposed and underground utilities and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.
 - b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.
 - c. The locations shall be referenced to at least two easily identifiable, permanent landmarks (e.g., power poles, valve markers, etc.) or benchmarks.
 - d. The Record Drawings shall include the horizontal angle and distance between manhole covers.
3. Structures
- a. Depths of various elements of foundation in relation to finish first floor datum or top of wall.
 - b. Location of internal and buried utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

1.6 SPECIFICATIONS

A. Legibly mark each section to record:

- 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
- 2. Changes made by Requests for Information (RFI), field order, clarification memorandums, or by change order.

1.7 SUBMITTAL

- A. At contract closeout, deliver Record Documents to the Engineer for the Owner.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Title and number of each record document
 - 5. Signature of Contractor or Contractor's authorized representative

END OF SECTION

SECTION 01740

Warranties and Bonds

PART 1 GENERAL

1.1 PROJECT MAINTENANCE AND WARRANTY

- A. Maintain and keep in good repair the Work covered by these Drawings and Specifications until acceptance by the Owner.
- B. The Contractor shall warrant for a period of one year from the date of Owner's written acceptance of certain segments of the Work and/or Owner's written final acceptance of the Project, as defined in the Contract Documents, that the completed Work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.
- C. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.
- D. In the event of multiple failures of major consequences prior to the expiration of the one year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new 12 month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over-or under-lubrication and using maintenance procedures not conforming with

- published maintenance instructions, shall be exempted from the scope of the one year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be disassembled, inspected, modified or replaced as necessary and rewarranted for one year.
- E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.
- F. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.
- G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.
- H. In the event the Contractor fails to proceed to remedy the defects upon notification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.
- I. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.
- J. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION

SECTION 02010
Subsurface Conditions

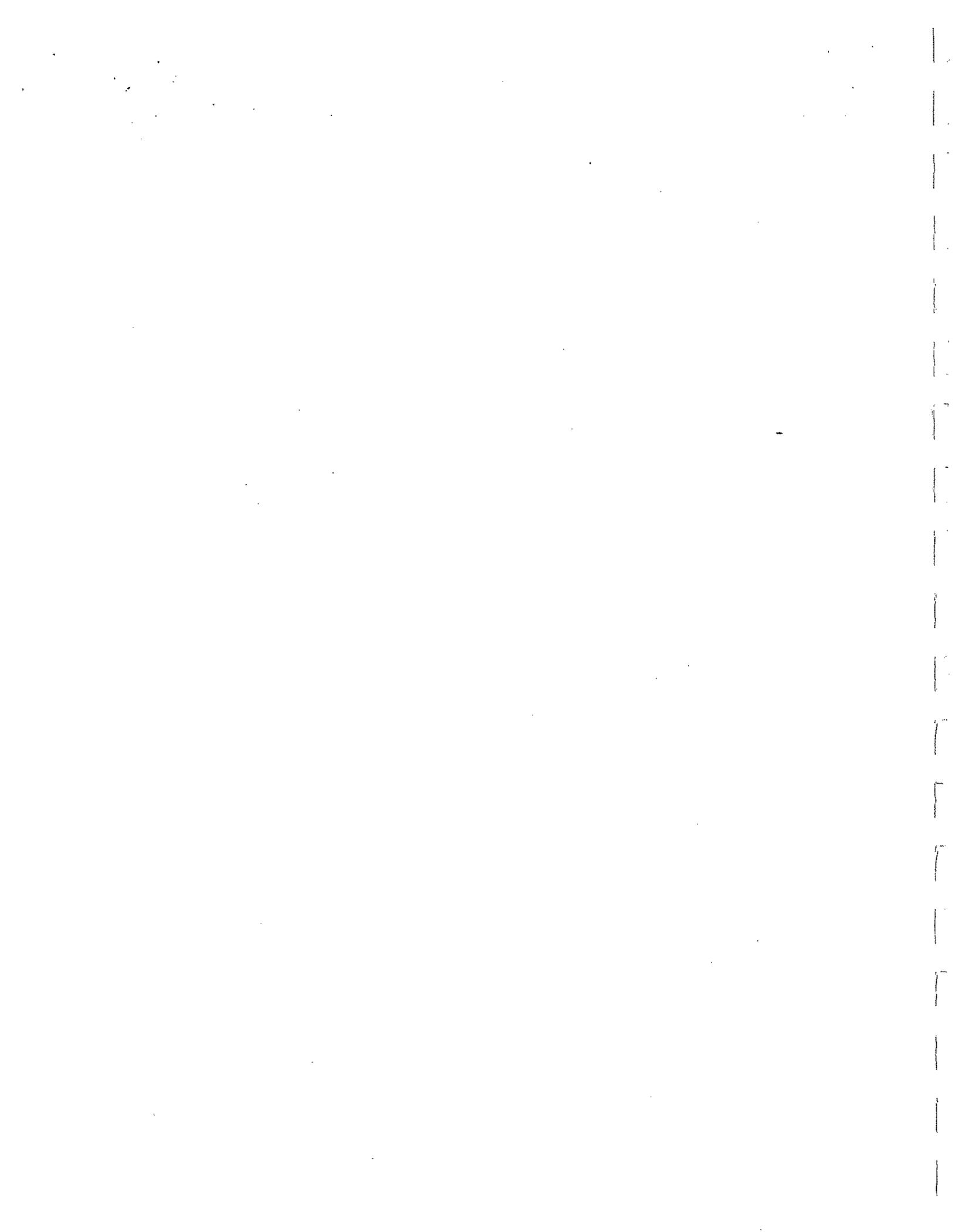
PART 1 GENERAL

1.1 DESCRIPTION

- A. Investigation: The Contractor shall visit the site and become acquainted with site conditions. Prior to bidding, prospective Contractors may make their own site and subsurface investigations to satisfy themselves with site and subsurface conditions. The Contractor shall be responsible for obtaining rights of ingress and egress to private property for site and subsurface investigation and shall assume all responsibility for any damage to property caused as a result of the Contractor's investigation.

- B. No geotechnical investigation has been performed on this site. The Contractor is responsible for making their own determination of subsurface conditions.

END OF SECTION



SECTION 02140

Dewatering

PART 1 GENERAL

1.1 SCOPE

- A. This Section shall apply to all excavation, except trench excavation.
- B. Construct all permanent work in areas free from water. Design, construct and maintain all dikes, levees, cofferdams and diversion and drainage channels as necessary to maintain the areas free from water and to protect the areas to be occupied by permanent work from water damage. Remove temporary works after they have served their purpose.
- C. The Contractor shall be responsible for the stability of all temporary and permanent slopes, grades, foundations, materials and structures during the course of the Contract. Repair and replace all slopes, grades, foundations, materials and structures damaged by water, both surface and subsurface, to the lines, grades and conditions existing prior to the damage, at no additional cost to the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 CARE OF WATER

- A. Except where the excavated materials are designated as materials for permanent work, material from required excavation may be used for dikes, levees, cofferdams and other temporary backfill.
- B. Furnish, install, maintain and operate necessary pumping and other equipment for dewatering the various parts of the work and for maintaining the foundation and other parts free from water as required for constructing each part of the work.
- C. Install all drainage ditches, sumps and pumps to control excessive seepage on excavated slopes, to drain isolated zones with perched water tables and to drain impervious surfaces at final excavation elevation.
- D. Dewater by means which will insure dry excavations, preserve final lines and grades, do not disturb or displace adjacent soil.
- E. All pumping and drainage shall be done with no damage to property or structures and without interference with the rights of the public, owners of private property,

pedestrians, vehicular traffic or the work of other contractors, and in accordance with all pertinent laws, ordinances and regulations.

- F. Do not overload or obstruct existing drainage facilities.
- G. After they have served their purpose, remove all temporary protective work at a satisfactory time and in a satisfactory manner. All diversion channels and other temporary excavations in areas where the compacted fill or other structures will be constructed shall be cleaned out, backfilled and processed under the same Specifications as those governing the compacted fill.
- H. When the temporary works will not adversely affect any item of permanent work or the planned usage of the Project, the Contractor may be permitted to leave such temporary works in place. In such instances, breaching of dikes, levees and cofferdams may be required.

3.2 DEWATERING

- A. By the use of well points, pumps, tile drains or other approved methods, the Contractor shall prevent the accumulation of water in excavated areas. Should water accumulate, it shall be promptly removed.
- B. Excavations shall be continuously dewatered to maintain a ground water level no higher than three to four feet below the lowest point in the excavation. Dewatering shall be accomplished well enough in advance of excavation to ensure that groundwater is already lowered prior to completing the final excavation to finish subgrade.
- C. All destabilized subgrade conditions caused by inadequate or untimely dewatering operations shall be undercut and backfilled with suitable backfill material at no additional cost to the Owner.
- D. Piezometric observation wells are required to monitor the ground water level to insure proper dewatering prior to excavation below the static water table. The number of wells required will vary depending on the size and depth of structures.

END OF SECTION

SECTION 02200
Earthwork

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Extent of earthwork is indicated on the Drawings.
1. Preparation of subgrade for tanks, basins, building slabs, walks, and pavements is included as part of this work.
 2. Engineered fill course for support of building or basin slabs is included as part of this work.
 3. Backfilling of tanks, basins, basements, and trenches within building lines is included as part of this work.
- B. Excavation for Mechanical/Electrical Work: Excavation and backfill required in conjunction with underground mechanical and electrical utilities, and buried mechanical and electrical appurtenances is included as work of this Section.
- C. Definition: "Excavation" consists of removal of all material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

1.2 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Testing and Inspection Services: Employ, at Contractor's expense, testing laboratory acceptable to the Owner to perform soil testing and inspection service for quality control testing during earthwork operations.

1.3 SUBMITTALS

- A. Test Reports-Excavating

Submit following reports directly to the Engineer from the testing services, with copy to Contractor:

1. Test reports on borrow material.
2. Verification of each footing subgrade.
3. Field density test reports.

4. One optimum moisture-maximum density curve for each type of soil encountered.
5. Report of actual unconfined compressive strength and/or results of bearing tests on each strata tested.

1.4 JOB CONDITIONS

A. Site Information

1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil bearings. It is expressly understood that Owner will not be responsible for interpretation or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor.
2. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

B. Existing Utilities: Prior to commencement of work, the Contractor shall locate existing underground utilities in areas of the work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

C. Use of Explosives: The Contractor (or any of his subcontractors) shall not bring explosives onto site or use in work without prior written permission from the Owner. All activities involving explosives shall be in compliance with the rules and regulations of the Kentucky Department of Mines and Minerals, Division of Explosives and Blasting. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

D. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning lights.
 - a. Operate warning lights as recommended by authorities having jurisdiction.
 - b. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Definitions

1. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, SP, GC, SC, ML and CL.
2. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups MH, CH, OL, OH and PT.
3. Subbase Material: Naturally and artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.
4. Drainage fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1-1/2 inch sieve and not more than 5 percent passing a No. 4 sieve.
5. Backfill and fill materials: Satisfactory soil materials free of debris, waste, frozen materials, vegetable, and other deleterious matter.
6. Engineered fill: (Refer to this Section, paragraph 3.7 A.1.)

PART 3 EXECUTION

3.1 STRIPPING AND TOPSOILING

- A. Before excavation and grading is commenced for buildings, structures or other work described hereinafter (except pipelines and manholes), the material meeting the topsoil specification of these Specifications shall be removed from the areas affected and stock-piled. When final grading is accomplished, particularly around buildings and other structures, the topsoil shall be spread evenly over the excavated area. Rough grading above excavated areas shall have been carried approximately 6 inches below finished grade (except solid rock, where it shall be carried 12 inches below finished grade) and brought back up to grade with topsoil as set out herein.

3.2 EXCAVATION

1. Cut surface under pavements to comply with cross-sections, elevations, and grades as shown.

K. Trench Excavation

1. The Contractor shall include in his lump sum bid all trenching and backfill necessary for installation of all pipelines as planned and specified. Trenching shall include clearing and grubbing of all trash, weeds, briars, trees, stumps encountered in trenching. The Contractor shall dispose of such material at no extra cost to the Owner. Shrubs shall be removed, maintained and replanted in the same or adjacent location as the Engineer may direct. Trenching also included such items as railroad, street, road, sidewalk, pipe, and small creek crossings; cutting, moving or repairing damage to fences, posts, gates, and other surface structures regardless of whether shown on the Drawings.
2. All existing facilities shall be protected from danger or damage while pipelines are being constructed and backfilled, and from damage due to settlement of the backfill.
3. In the event any existing structure is damaged, repair and restoration shall be made at once and backfill shall not be replaced until this is done. Restoration and repair shall be such that the damaged structure is equal to or better than its original condition and can serve its purpose as completely as before. All such restoration and repair shall be done without extra cost to the Owner.
4. Trenches must be dug to lines and grades shown on the Drawings. Hand trenching may be required in areas where machine trenching would result in undue damage to existing structures and facilities.
5. Excavation shall be open trenches, except where otherwise shown on the Drawings, for tunneling, boring, or jacking under structures, railroad, sidewalks and roads.
6. Sheeting and shoring of trenches shall be provided at the expense of the Contractor where necessary to protect life, property and the new or existing structures from damage or to maintain maximum permissible trench widths at top of pipe. All necessary materials, including, but not limited to, sheeting, sheet piling, trench jacks, braces, shores and stringers, shall be used to hold trench walls. Sheeting and shoring may be withdrawn as the trenches are being backfilled, after backfill has been tamped over top of the pipe at least 18 inches. If removal before backfill is completed to surface endangers adjacent structures, such as buildings, pipelines, street paving, and sidewalks, then the sheeting and shoring shall be left in place until such danger has passed, and then pulled if practical. Voids caused by sheeting

withdrawal shall be backfilled and tamped. If not withdrawn, sheeting shall be cut off at least 18 inches below final surface grade, so there is no obstruction at the ground level. In the event the Owner directs the Contractor to leave shoring materials in place, the Owner will reimburse the Contractor for the reasonable cost of leaving such materials in place.

7. Where subgrade of trench has insufficient stability to support the pipeline and hold it to its original grade, the Engineer may order stabilization by various means. Exclusive of dewatering normally required for construction, and instability caused by neglect of the Contractor, the necessary stabilization shall be paid for at unit prices established in the Contract. In the event no particular bid price is applicable, then the payment for stabilization will be negotiated.
8. The location of the pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before construction on any line is started that would indicate desirable changes in location. The Owner reserves the right to make reasonable changes in line and structure locations without extra cost, except as may be determined by extra units of materials and construction actually involved. The Owner is under no obligation to locate pipelines, so they may be excavated by machine.
9. Tunneling may be used at the Contractor's option as an alternate to open-cut trenching, at no extra cost to the Owner. The annular space between plates and excavation shall be either permanently placed pea gravel or sand, pumped grout (3 parts sand and 1 part Portland cement by volume) or other suitably installed material approved by the Engineer. Backfilling shall be kept close to the heading and completed after each day's work. Where grout is used for backfill, injection holes with threaded plugs shall be provided in linear plates at various levels and in sufficient number of effectively grout to void around the tunnel. A minimum of 3 grout holes shall be provided in each 8 feet of tunnel length. Grout shall be injected in the lower holes first, proceeding upward as the void is filled. Plugs shall be installed after each hole is filled and grout stops shall be provided behind plates as necessary to ensure complete filling of the void. In tunneling under buildings, the Contractor will be responsible for all damage resulting from his operations and methods of excavation and backfilling. Boring may also be used at the Contractor's option as an alternate to tunneling or open-cut trenching, at no extra cost to the Owner.
10. Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.

- a. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.
- b. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of crushed stone or gravel prior to installation of pipe.
- c. For pipes or conduit 3 inches or less in nominal size and for flat-bottomed, multiple-duct conduit units, excavate to subbase depth indicated or, if not indicated, then to 4 inches below bottom of work to be supported.
- d. For pipes or conduit 6 inches or larger in nominal size, tanks, and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated or, if not otherwise indicated, to 6 inches below bottom of work to be supported.
- e. Except as otherwise indicated, excavation for exterior water-bearing piping (water, steam, condensate, drainage) so top of piping is no less than 3 feet 0 inches below finish grade.
- f. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
- g. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.
- h. Concrete is specified in Division 3.
- i. Do not backfill trenches until tests and inspections have been made and backfilling authorized by the Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
- j. For piping or conduit less than 3 feet 0 inches below surface of roadways, furnish and install steel casing pipe, minimum wall thickness of 1/4", or sufficient diameter to carry the pipe or conduit to at least two feet beyond outside edge of pavement.

L. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F (1°C).

3.3 COMPACTION

A. General

1. Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.
 - a. Percentage of maximum density requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D698 and not less than the following percentages of relative density, determined in accordance ASTM D4253 and D4254, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).
 - b. Structures, building slabs and steps, pavements: Compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent standard proctor density.
 - c. Lawn or unpaved areas: Compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent standard proctor density.
 - d. Walkways: Compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent standard proctor density.

B. Moisture Control

1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface or subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.4 BACKFILL AND FILL

A. General

1. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below. Backfill material shall be no larger than the specified depth of the layer to be placed and/or compacted.
 - a. In excavations, use satisfactory excavated or borrow material.
 - b. Under grassed areas, use satisfactory excavated or borrow material.
 - c. Under walks and pavements, use subbase material, or satisfactory excavated or borrow material, or combination of both.
 - d. Under steps, use subbase material.
 - e. Under building slabs, use subbase material for a minimum depth of 6 inches.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damproofing, waterproofing, and perimeter insulation.
2. Inspection, testing, approval, and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
5. Removal of trash and debris.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Ground Surface Preparation

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow,

strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

2. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.

D. Placement and Compaction

1. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers. Crushed stone shall be installed in accordance with Section 02255.
 - a. Before compaction, add moisture or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - b. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Backfilling Trenches

1. Backfilling shall be accomplished as soon as practical after pipe has been laid and jointing and alignment approved. Packing of crushed rock between joints shall be the usual procedure as the laying progresses. This is in order to avoid danger of misalignment from slides, flooding or other causes. The Engineer shall be given a maximum of 24 hours for inspection before backfilling.
2. Any special requirements of the Railroad Company or Highway Department in regard to backfilling will take precedence over the following general Specifications.
3. The backfill over the pipe shall be in accordance with the standard details shown on the Drawings for bedding and backfilling pipe.

4. In case maximum permissible trench widths (as designated by the pipe manufacturer) are exceeded, the Contractor shall furnish crushed rock backfill to a minimum of 12 inches over the top of pipe at no extra cost to the Owner.
5. After the foregoing cover requirements over top of the pipe have been met, rock may be used in the backfill in pieces no larger than 12 inches in any dimension and to an extent not greater than one-half the backfilling materials used. If additional earth is required for backfilling, it must be obtained and placed by the Contractor. Filling with rock and earth shall proceed simultaneously, such that no voids are left in the rock. After cover requirements over top of pipe have been met, backfilling may be employed without tamping, provided caution is used in quantity per dump and uniformity of level of backfilling. Surplus material shall be uniformly ridged over trench and excess rock hauled away, with no rock over 1-1/2 inch diameter in the top 6 inches. Ridged backfill shall be confined to the width of the trench and no higher than needed for replacement of settlement of backfill.
6. In the case of street, highway, railroad, sidewalk and driveway crossings; or within any roadway paving; or about manholes, valve and meter boxes; the backfill must be mechanically tamped in not over 6 inch layers, measured loose. Alternate method of compacting backfill shall be used, if refill material is in large hard lumps (crushed rock excepted) which cannot be consolidated without leaving voids.
7. In the case of tunnels, the annular space between plates and excavation shall be either permanently placed pea gravel or sand, pump grout (3 parts sand and 1 part Portland cement by volume) or other suitably installed material approved by the Engineer. Backfilling shall be kept close to the heading and completed after each day's work. Where grout is used for backfill, injection holes with threaded plugs shall be provided in liner plates at various levels and in sufficient number to effectively grout the void around the tunnel. A minimum of 3 grout holes shall be provided in each 8 feet of tunnel length. Grout shall be injected in the lower holes first, proceeding upward as the void is filled. Plugs shall be installed after each hole is filled and grout stops shall be provided behind plates as necessary to ensure complete filling of the void.
8. Where traffic on streets, driveways, railroads, sidewalks and highways requires temporary surfacing, backfilling shall be terminated 4 inches below original ground level and 4 inches to 6 inches of dense graded aggregate shall be placed on the trench. Backfills shall be maintained easily passible to traffic at original ground level, until acceptance of project or replacement of paving or sidewalks.

9. The Contractor shall protect all sewer, gas, electric, telephone, water and drain pipes or conduits from damage while pipelines are being constructed and backfilled, and from danger due to settlement of trench backfill.
10. No extra pavement shall be made for backfilling of any kind, except as specified hereinbefore. Backfilling shall be included as a part of the lump sum bid. No extra payment will be made to the Contractor for supplying outside materials for backfill.
11. On completion of the project, all backfills shall be dressed; holes filled; and surplus material hauled away. All permanent walks, street paving, roadway, etc., shall be restored and seeding and sodding performed as required.

3.5 GRADING

A. General

1. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Building Lines

1. All materials used for backfill around structures shall be of a quality acceptable to the Engineer and shall be free from large or frozen lumps, wood and other extraneous material. All spaces excavated and not occupied by footings, foundations walls or other permanent work shall be refilled with earth up to the surface of the surrounding ground, unless otherwise specified, with sufficient allowance for settlement. In making the fills and terraces around the structures, the fill shall be placed in layers not exceeding 12 inches in depth and shall be kept smooth as the work progresses. Each layer of the fill shall be rolled with an approved type roller and/or be compacted. When it is not practicable to compact sections of the fill immediately adjacent to buildings or structures by rolling, then such section shall be thoroughly compacted by means of mechanical tamping or hand tamping as may be required by the conditions encountered. All fills shall be placed so as to load structures symmetrically.
2. As set out hereinbefore, rough grading shall be held below finished grade and then the topsoil which has been stockpiled shall be evenly spread over the surface. The grading shall be brought to the levels shown on the

Drawings or to the elevations established by the Engineer. Final dressing shall be accomplished by hand work or machine work, or a combination of these methods as may be necessary to produce a uniform and smooth finish to all parts of the regrade. The surface shall be free from clods greater than 2 inches in diameter. Excavated rock may be placed in the fills, but it shall be thoroughly covered. Rock placed in fills shall not be closer than 12 inches from finished grade.

3. Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

a. Finish surfaces free from irregular surface changes, and as follows:

- (1) Lawn or unpaved areas: Finish areas to receive topsoil to within not more than 0.10 ft. above or below required subgrade elevations.
- (2) Walks: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.0 inch above or 1.0 inch below required subgrade elevation.
- (3) Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 0.0 inch above or 1 inch below required subgrade elevation.

C. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 0.0 inch above or 1 inch below required subgrade elevation when tested with a 10 ft. straightedge.

D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or standard proctor density for each area classification.

3.6 PAVEMENT SUBBASE COURSE

A. General

1. Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.
2. See other Division 2 sections for paving specifications.

- B. **Grade Control:** During construction, maintain lines and grades including crown and cross-slope of subbase course.
- C. **Shoulders**
 - 1. Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12 inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.
- D. **Placing**
 - 1. Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
 - 2. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.7 BUILDING SLAB ENGINEERED FILL COURSE

- A. **General**
 - 1. Engineered fill course consists of placement of crushed stone, size and type shown on drawings, in layers of indicated thickness, over subgrade surface to support concrete building slabs.
- B. **Placing**
 - 1. Place fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.
 - 2. When a compacted course is shown to be 6 inches or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.8 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction

1. Allow testing service to inspect and report to the Engineer on findings and approve subgrades and fill layers before further construction work is performed.
 - a. Perform field density tests in accordance with ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2992 (nuclear density method), as applicable.
 - b. Footing subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Engineer.
 - c. Paved areas and building slab subgrade: Make at least one field density test of subgrade for every 2,000 square feet of paved area or building slab, but in no case less than three tests. In each compacted fill layer, make one field density test for every 2,000 square feet of overlaying building slab or paved area, but in no case less than three tests.
 - d. Foundation wall backfill: Take at least two field density tests, at locations and elevations as directed.
- B. If in opinion of the Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

3.9 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

-
- C. **Settling:** Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION

SECTION 02255
Crushed Stone and Dense Graded Aggregate

PART 1 GENERAL

1.1 SCOPE

- A. Furnish and install crushed stone for miscellaneous uses as shown on the Drawings, as called for in the Specifications.
- B. Sizes, types, and quality of crushed stone are specified in this Section, but its use for replacement of unsuitable material, pavement base, and similar uses is specified in detail elsewhere in the Specifications. The Engineer may order the use of crushed stone for purposes other than those specified in other sections, if, in his opinion, such use is advisable. Payment for same will be subject to negotiation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. When referred to in these Specifications, crushed stone shall be Number 57 graded in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Latest Edition, unless otherwise noted.
- B. When referred to in these Specifications, dense graded aggregate (DGA) shall be crushed stone classified by the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Latest Edition, and conforming to the following requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
1 inch	100
3/4 inch	70-100
3/8 inch	50-80
#4	35-65
#10	25-50
#40	15-30
#200	5-12

PART 3 EXECUTION

3.1 INSTALLATION

- A. Crushed stone shall be placed in uniform layers not greater than 6 inches deep and shaped by power equipment to required lines, grades, cross sections, and depths. No minimum compacted density, method of compaction, or compaction equipment is required since a nominal amount of compaction effort with vibration can establish the desired intergranular locking of the aggregate under controlled placement depth. Acceptable compaction can be achieved with pneumatic-tired and tracked equipment and rollers.
- B. All compaction operation shall be performed to the satisfaction of the Engineer.
- C. Crushed stone shall be placed in those areas as shown on the Drawings and as may be directed by the Engineer.

END OF SECTION

SECTION 02513
Bituminous Concrete Paving

PART 1 GENERAL

1.1 GENERAL

A. RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. DESCRIPTION OF WORK

1. Extent of bituminous concrete paving work is shown on drawings.
2. Prepared aggregate subbase is specified in earthwork sections.

C. SUBMITTALS

1. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceed, specified requirements.

D. QUALITY ASSURANCE

1. Codes and Standards: Comply with Kentucky Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, and with local governing regulations if more stringent than herein specified.

E. SITE CONDITIONS

1. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg. F (10 deg. C), and when temperature has not been below 35 deg. F (1 deg. C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

2. Construct asphalt concrete surface course when atmospheric temperature is above 40 deg. F (4 deg. C), and when base is dry. Base course may be placed when air temperature is above 30 deg. F (-1 deg. C) and rising.
3. Grade Control: Establish and maintain required lines and elevations.

1.2 PRODUCTS

A. MATERIALS

1. General: Use locally available material and gradations which exhibit a satisfactory record of previous installations.
2. Base Course Aggregate: Sound, angular crushed stone, crushed gravel, or crushed slag, sand, stone or slag screenings.
3. Surface Course Aggregate: Crushed stone, crushed gravel, crushed slag, and sharp-edged natural sand.
4. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with AASHTO M 17 (ASTM D 242).
5. Asphalt Cement: AASHTO M 226 (ASTM D 3381) for viscosity-graded material.
6. Prime Coat: Cut-back asphalt type; AASHTO M 82 (ASTM D 2027) MC-30, MC-70 or MC-250.
7. Tack Coat: Emulsified asphalt; AASHTO M 140 (ASTM D 977) or M 208 (D 2397); SS-1, SS-1h, CSS-1 or CSS-1h, diluted with one part water to one part emulsified asphalt.
8. Lane Marking Paint: Chlorinated rubber-alkyd type, AASHTO M 248 (FS TT-P-115), Type III.

B. ASPHALT-AGGREGATE MIXTURE

1. Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with Kentucky State Specification Section 400.

1.3 EXECUTION

A. SURFACE PREPARATION

1. Remove loose material from compacted subbase surface immediately before applying prime coat.
2. Proof roll prepared subbase surface to check for unstable areas and areas requiring additional compaction.
3. Notify Contractor of unsatisfactory conditions. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.
4. Prime Coat: Apply at rate of 0.20 to 0.50 gal. per sq. yd., over compacted subgrade. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile.
5. Tack Coat: Apply to contact surfaces of previously constructed asphalt or portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface.
6. Allow to dry until at proper condition to receive paving.
7. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

B. PLACING MIX

1. General: Place asphalt concrete mixture on prepared surface, spread and strike-off. Spread mixture a minimum temperature of 225 deg. F (107 deg. C). Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness.
2. Paver Placing: Place in strips not less than 10' wide, unless otherwise acceptable to Architect. After first strip has been placed and rolled, place succeeding strips and extend rolling to

overlap previous strips. Complete base course for a section before place in surface course.

3. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

C. ROLLING

1. General: Begin rolling when mixture will bear roller weight without excessive displacement.
2. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
3. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.
4. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
5. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
6. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.
7. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
8. Erect barricades to prevent paving from traffic until mixture has cooled enough not to become marked.

E. FIELD QUALITY CONTROL

1. **General:** Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Architect.
2. **Thickness:** In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
 - a. **Base Course:** 1/2", plus or minus.
 - b. **Surface Course:** 1/4", plus or minus.
3. **Surface Smoothness:** Test finished surface of each asphalt concrete course for smoothness, using 10' straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness.
 - a. **Base Course Surface:** 1/4".
 - b. **Wearing Course Surface:** 3/16".
 - c. **Crowned Surfaces:** Test with crowned template centered and at right angle to crown. Maximum allowable variance from template, 1/4".
4. Check surface areas at intervals as directed by Architect.

END OF SECTION

SECTION 02665

Water Mains and Accessories

PART 1 GENERAL

1.01 SCOPE

- A. This Section describes products to be incorporated into the water mains and requirements for the installation and use of these items. Furnish all products and perform all labor necessary to fulfill the requirements of these Specifications.
- B. General: Supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable.

1.02 QUALIFICATIONS

If requested by the Engineer, submit evidence that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two years.

1.03 SUBMITTALS

Complete shop drawings and engineering data for all products shall be submitted to the Engineer in accordance with the requirements of Section 01340 of these Specifications.

1.04 TRANSPORTATION AND HANDLING

- A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against the pipe on the ground.
- B. Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front end loader. Do not use material damaged in handling. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe.

1.05 OWNER FURNISHED MATERIALS (Not Used)**1.06 STORAGE AND PROTECTION**

- A. Store all pipe which cannot be distributed along the route. Contractor shall make arrangements for the use of suitable storage areas.
- B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.
- C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipe in adjacent tiers.
- D. Stored mechanical and push-on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.
- E. Mechanical-joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

1.07 QUALITY ASSURANCE

The manufacturer shall provide written certification to the Engineer that all products furnished comply with all applicable requirements of these Specifications.

PART 2 PRODUCTS**2.01 PIPING MATERIALS AND ACCESSORIES**

- A. Ductile Iron Pipe (DIP)
 - 1. Ductile iron pipe shall be manufactured in accordance with AWWA C151. All pipe, except specials, shall be furnished in nominal lengths of 18 to 20 feet. Sizes will be as shown on the Drawings. All pipe shall have a minimum pressure rating as indicated in the following table, and corresponding minimum wall thickness, unless otherwise specified or shown on the Drawings:

Pipe Sizes (inches)	Pressure Class (psi)
4 - 12	350
14 - 18	250
20	250
24	200
30 - 54	250
60 - 64	200

2. Flanged pipe minimum wall thickness shall be equal to Special Class 53. Flanges shall be furnished by the pipe manufacturer.
3. Pipe and fittings shall be cement lined in accordance with AWWA C104. Pipe and fittings shall be furnished with a bituminous outside coating.
4. Fittings shall be ductile iron and shall conform to AWWA C110 or AWWA C153 with a minimum rated working pressure of 250 psi or as indicated on plans.
5. Joints
 - a. Unless shown or specified otherwise, joints shall be push-on or restrained joint type for pipe and standard mechanical, push-on or restrained joints for fittings. Push-on and mechanical joints shall conform to AWWA C111. Restrained joints for pipe and fittings shall be American "FLEX-RING" or "LOK-RING", Clow "SUPER-LOCK", or U.S. Pipe "TR FLEX". No field welding of restrained joint pipe will be permitted. No mega lug type restraints are allowed on 24" and 30" water line.
 - b. Restrained joint pipe (RJP) on supports shall have bolted joints and shall be specifically designed for clear spans of at least 36 feet.
 - c. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.
6. Provide the appropriate gaskets for mechanical and flange joints. Gaskets for flange joints shall be made of 1/8-inch thick, cloth reinforced rubber; gaskets may be ring type or full face type.
7. Provide the necessary bolts for mechanical, restrained and flange connections. Bolts for flange connections shall be steel with American

Regular unfinished square or hexagon heads. Nuts shall be steel with American Standard Regular hexagonal dimensions, all as specified in ANSI B17.2. All bolts and all nuts shall be threaded in accordance with ANSI B1.1, Coarse Thread Series, Class 2A and 2B fit. Mechanical joint glands shall be ductile iron.

8. Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

B. Polyvinyl Chloride Pipe (PVC) - (SDR-21)

1. All PVC pipe shall have belled ends for push-on type jointing and shall conform to ASTM D 2241. The pipe shall have a Standard Dimension Ratio (SDR) of 21 and shall be capable of withstanding a working pressure of 200 psi. Pipe shall be supplied in minimum lengths of 20 feet.
2. All fittings shall be of cast or ductile iron meeting the requirements of AWWA C110 or AWWA C153 with a minimum rated working pressure of 150 psi. Fittings shall be cement lined in accordance with AWWA C104. Fittings shall be furnished with a bituminous outside coating. Special adapters shall be provided as recommended by the manufacturer to adapt the PVC pipe to mechanical jointing with cast or ductile iron pipe, fittings, or valves.
3. Detection tape shall be provided over all PVC water mains.
4. Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards, including the National Sanitation Foundation. Additionally, each piece of pipe shall be stamped "NSF Approved".

C. Polyvinyl Chloride Pipe (PVC) - (C-900)

1. All PVC pipe shall have belled ends for push-on type jointing and shall conform to AWWA C900, ductile iron pipe equivalent outside diameters. The pipe shall have a Dimension Ratio (DR) of 14 and shall be capable of withstanding a working pressure of 200 psi. Pipe shall be supplied in minimum lengths of 20 feet.
2. All fittings shall be of cast or ductile iron meeting the requirements of AWWA C110 or AWWA C153 with a minimum rated working pressure of

250 psi. Fittings shall be cement lined in accordance with AWWA C104. Fittings shall be furnished with a bituminous outside coating. Special adapters shall be provided, as recommended by the manufacturer, to adapt the PVC pipe to mechanical jointing with cast or ductile iron pipe, fittings or valves.

3. Detection tape shall be provided over all PVC water mains.
4. Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards, including the National Sanitation Foundation. Additionally, each piece of pipe shall be stamped "NSF Approved".

2.02 VALVES

A. Gate Valves (GV)

1. 3-Inches in Diameter and Smaller: Gate valves shall be bronze, heavy duty, rising stem, wedge type with screwed or union bonnet. Valve ends shall be threaded or solder type as appropriate. Valves shall have a minimum 200 psi working pressure for water (125 psi working pressure for steam). Valves shall be made in the U.S.A. Gate valves shall be equal to Crane No. 428 (threaded) or Crane No. 1334 (solder end).
2. 4-Inches Through 12-Inches in Diameter: Gate valves 4-inches through 12-inches shall be resilient wedge type conforming to the requirements of AWWA C509 rated for 200 psi working pressure.
 - a. Valves shall be provided with two O-ring stem seals with one O-ring located above and one O-ring below the stem collar. The area between the O-rings shall be filled with lubricant to provide lubrication to the thrust collar bearing surfaces each time the valve is operated. At least one anti-friction washer shall be utilized to further minimize operating torque. All seals between valve parts, such as body and bonnet, bonnet and bonnet cover, shall be flat gaskets or O-rings.
 - b. The valve gate shall be made of cast iron having a vulcanized, synthetic rubber coating, or a seat ring attached to the disc with retaining screws. Sliding of the rubber on the seating surfaces to compress the rubber will not be allowed. The design shall be such that compression-set of the rubber shall not affect the ability of the

- valve to seal when pressure is applied to either side of the gate. The sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.
- c. All internal ferrous surfaces shall be coated with epoxy to a minimum thickness of 4 mils. The epoxy shall be non-toxic, impart no taste to the water and shall conform to AWWA C550, latest revision.
 - d. Gate valves 4 through 12-inches shall be manufactured by American-Darling, Mueller or M & H Valve.

B. Butterfly Valves (BV)

1. Butterfly valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with all requirements of AWWA C504, and as modified below. Valves shall be designed for a rated working pressure of 250 psi. Class B, AWWA C504 Section 5.2 testing requirements are modified as follows:
 - a. the leakage test shall be performed at a pressure of 250 psi;
 - b. the hydrostatic test shall be performed at a pressure of 500 psi; and
 - c. proof of design tests shall be performed and certification of such proof of design test shall be provided to the Engineer.
2. Valve bodies shall be ductile iron conforming to ASTM A 536, Grade 65-45-12 or ASTM A 126, Grade B cast iron. Shafts and shaft hardware shall be ASTM A 564, Type 630 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A 536, Grade 65-45-12. The resilient valve seat shall be located either on the valve disc or in the valve body and shall be fully field adjustable and field replaceable.
3. Valves shall be installed with the valve shafts horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.
4. Actuators
 - a. Valves shall be equipped with traveling nut, self-locking type actuators designed, manufactured and tested in accordance with AWWA C504. Actuators shall be capable of holding the disc in any position between full open and full closed without any movement or fluttering of the disc.

- b. Actuators shall be furnished with fully adjustable mechanical stop-limiting devices. Actuators that utilize the sides of the actuator housing to limit disc travel are unacceptable.
 - c. Valve actuators shall be capable of withstanding a minimum of 450 foot pounds of input torque in either the open or closed position without damage.
5. Operators: Valves for buried service shall have a nut type operator and shall be equipped with a valve box and stem extension, as required.
 6. Valve ends shall be mechanical joint type, except where flanged or restrained joint ends are shown. Flange joints shall meet the requirements of ANSI B16.1, Class 125. MJ Joint ends shall be restrained were called for using American MJ coupled joint or approved equal.
 7. Butterfly valves shall be manufactured by Mueller, M & H Valve, DeZurik, or Pratt.

2.03 FIRE HYDRANTS (FH)

- A. All fire hydrants shall conform to the requirements of AWWA C502 for 250 psi working pressure. Hydrants shall be the compression type, closing with line pressure. The valve opening shall not be less than [5-1/4-inches].
- B. In the event of a traffic accident, the hydrant barrel shall break away from the standpipe at a point above grade and in a manner which will prevent damage to the barrel and stem, preclude opening of the valve, and permit rapid and inexpensive restoration without digging or cutting off the water.
- C. The means for attaching the barrel to the standpipe shall permit facing the hydrant a minimum of eight different directions.
- D. Hydrants shall be fully bronze mounted with all working parts of bronze. Valve seat ring shall be bronze and shall screw into a bronze retainer.
- E. All working parts, including the seat ring shall be removable through the top without disturbing the barrel of the hydrant.
- F. The operating nut shall match those on the existing hydrants. The operating threads shall be totally enclosed in an operating chamber, separated from the hydrant barrel by a rubber O-ring stem seal and lubricated by a grease or an oil reservoir.

- G. Hydrant shall be a non-freezing design and be provided with a simple, positive, and automatic drain which shall be fully closed whenever the main valve is opened.
- H. Hose and pumper connections shall be breech-locked, pinned, or threaded and pinned to seal them into the hydrant barrel. Each hydrant shall have two 2-1/2-inch hose connections and one 4-1/2-inch pumper connection, all with National Standard threads and each equipped with cap and non-kinking chain.
- I. Hydrants shall be furnished with a mechanical joint connection to the spigot of the 6-inch hydrant lead.
- J. Minimum depth of bury shall be 4.5 feet. Provide extension section where necessary for proper vertical installation and in accordance with manufacturer's recommendations.
- K. All outside surfaces of the barrel above grade shall be painted with enamel equal to Koppers Glamortex 501 in a color to be selected by the Owner.
- L. Hydrants shall be traffic model and shall be Mueller Super Centurion or approved equal.

2.04 VALVE BOXES (VB) AND EXTENSION STEMS

- A. All valves shall be equipped with valve boxes. The valve boxes shall be cast iron two-piece screw type with drop covers. Valve boxes shall have a 5.25-inch inside diameter. Valve box covers shall weigh a minimum of 13 pounds. The valve boxes shall be adjustable to 6-inches up or down from the nominal required cover over the pipe. Valve boxes shall be of sufficient length that bottom flange of the lower belled portion of the box is below the valve operating nut. Ductile or cast iron extensions shall be provided as necessary. Covers shall have "WATER VALVE" or "WATER" cast into them. Valve boxes shall be manufactured in the United States.
- B. All valves shall be furnished with extension stems, as necessary, to bring the operating nut to within 30-inches of the top of the valve box. Connection to the valve shall be with a wrench nut coupling and a set screw to secure the coupling to the valve's operating nut. The coupling and square wrench nut shall be welded to the extension stem. Extension stems shall be equal to Mueller A-26441 or M & H Valve Style 3801.

2.05 VALVE MARKERS (VM)

The Contractor shall provide a concrete valve marker as detailed on the Drawings for each valve installed. Valve markers shall be stamped "Water".

2.06 TAPPING SLEEVES AND VALVES (TS&V)

Tapping sleeves shall be cast or ductile iron of the split-sleeve, mechanical joint type. The Contractor shall be responsible for determining the outside diameter of the pipe to be connected to prior to ordering the sleeve. Valves shall be gate valves furnished in accordance with the specifications shown above, with flanged connection to the tapping sleeve and mechanical joint connection to the branch pipe. The tapping sleeve and valve shall be supplied by the valve manufacturer. Tapping sleeves shall be equal to American-Darling, Mueller or M & H Valve.

2.07 TAPPING SADDLES

Tapping saddles shall be ductile iron body type with O-ring gasket and alloy steel straps. Connection shall be flanged or mechanical joint as detailed on the Drawings. Tapping saddles shall be equal to ACIPCO A-10920.

2.08 CORPORATION COCKS AND CURB STOPS

Corporation cocks and curb stops shall be ground key type, shall be made of bronze conforming to ASTM B 61 or B 62, and shall be suitable for the working pressure of the system. Ends shall be suitable for flared tube compression type joint. Threaded ends for inlet and outlet of corporation cocks shall conform to AWWA C800; coupling nut for connection to flared copper tubing shall conform to ANSI B16.26. Corporation cocks and curb stops shall be manufactured by Mueller or Ford.

2.09 AIR VALVES

A. Air Release Valves: Air release valves shall be one of the following types:

1. The air release valve shall automatically release air accumulations from the pipeline due to the action of the float. When the air valve body fills with air, the float falls freely from the orifice to allow the air to escape to the atmosphere. When all the air has been exhausted from the valve body, the float will be buoyed up to seat against the orifice and prevent water from

being exhausted from the valve. The valve body and cover shall be constructed of cast iron (ASTM A 126-B). A synthetic orifice button shall be affixed to the valve cover to provide a non-corrosive seat for the float. The float shall be constructed of stainless steel. A resilient, Buna-N seat shall be attached to the float for drop-tight closure. The float shall be free floating within the valve body. Valve orifice size shall be as shown on the Drawings.

2. The air release valve shall automatically release air accumulations from the pipeline due to the action of the float and lever mechanism. When the air valve body fills with air, the float falls. Through the leverage mechanism, this causes the resilient seat to open the orifice and allow the air to escape to the atmosphere. When all the air has been exhausted from the valve body, the float will be buoyed up. Through the leverage mechanism, this will cause the resilient seat to close the orifice, preventing water from being exhausted from the valve. The valve body and cover shall be constructed of cast iron (ASTM A 126-B). The float shall be constructed of stainless steel and attached to a stainless steel lever mechanism. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure. Valve orifice size shall be as shown on the Drawings.

B. **Air/Vacuum Valve:** The air/vacuum valve shall discharge large amounts of air as the pipeline fills and allow air to enter the pipeline as it drains or in the event of vacuum conditions. The valve shall operate by means of a non-collapsible stainless steel float which seals an orifice. As air enters the valve the float shall drop from the orifice and allow the air to escape. As water rises in the valve, the float will again seal the orifice. The valve will be of such design that the float cannot blow shut at any air velocity. All working parts shall be of stainless steel. The inside of the valve body shall be epoxy coated. Valve inlet size shall be as shown on the Drawings.

C. **Combination Air Valves:** Combination air valves shall combine the features of an air release valve and an air/vacuum valve and shall be of one of the following types:

1. Valve shall consist of an air/vacuum valve described in paragraph B. above, with an air release valve described in A. above tapped into its body. The valve shall be of two-piece body design with an isolation gate valve separating the two valves.
2. Valve shall be single body, double orifice, allowing large volumes of air to escape out the larger diameter air and vacuum orifice when filling a pipeline and closes watertight when the liquid enters the valve. During large orifice

closure, the smaller diameter air release orifice will open to allow small pockets of air to escape automatically and independently of the large orifice. The large air/vacuum orifice shall also allow large volumes of air to enter through the orifice during pipeline drainage to break the vacuum. The Buna-N seats must be fastened to the valve, without distortion, for drop-tight shut-off. The float shall be stainless steel. Valve sizes shall be as shown on the Drawings.

- D. **Surge Check Valve:** Where shown on the Drawings or specified, provide a surge check valve on the inlet of the air/vacuum valve. The surge check valve shall be normally open, spring loaded valve consisting of a body, seat and plug bolted to the inlet of the air/vacuum valve. The surge check shall operate on the interphase between the kinetic energy and relative velocity flows of air and water, allowing air to pass through but water shall close the surge check, reducing the rate of water flow by means of throttling orifices in the plug to prevent shock closure of the air/vacuum valve. The surge check orifices must be an adjustable type to suit operating conditions in the field.
- E. All air valves and accessories shall be supplied by a single manufacturer and shall be G.A. Industries, APCO, Crispin or Val-Matic.

2.10 **METER SETTERS**

The meter setter shall be a tandem coppersetter as shown on the standard detail drawings with 3/4" double purpose ends and be 15" high with padlock wing. It shall be all purpose, designed for 5/8" x 3/4" meter and be of sufficient height to raise meters above the bottom of the meter box. The meter setter shall be Ford, or equal. Meter setters shall have an inverted key inlet valve.

Setters shall be installed so that the meters are centered in the meter box.

The water service line shall be extended a minimum of 18" beyond the meter box on the customer end. The end of the extension shall be capped or plugged to prevent entry of foreign material until the connection is made.

2.11 **WATER METERS**

Water meter shall be cold water displacement type meeting all requirement of AWWA C700-77. The meter sizes shall be 5/8-inch x 3/4-inch meters for 3/4" service rated at a flow of 20 gpm and 1" meters for 1" service rated at a flow of 50 gpm. Meters shall be of frost-proof design and be rotating disk type. The meters shall be equipped with a straight-reading register recording in U.S. Gallons hermetically sealed to prevent fogging and with a removable corrosion resistant

strainer screen between the outer case and measuring chamber. Register shall be equipped with a device to afford capability for accurately testing each meter according to AWWA Standards. The body case shall have the manufacturer's serial number imprinted thereon and have raised markings to indicate the direction of flow.

2.12 HYDRANT TEES (Not Used)

2.13 ANCHOR COUPLINGS (Not Used)

2.14 VALVE KEYS

The Contractor shall provide to the Owner one valve key for every five valves provided, but no more than three and not less than one valve key. Valve keys shall be 72-inches long with a tee handle and a 2-inch square wrench nut. Valve keys shall be furnished by the valve manufacturer. Valve keys shall be equal to Mueller A-24610 or ACIPCO No. 1303.

2.15 CONCRETE

Concrete shall have a compressive strength of not less than 3000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. For job mixed concrete, submit the concrete mix design for approval by the Engineer. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

PART 3 EXECUTION

3.01 EXISTING UTILITIES AND OBSTRUCTIONS

- A. The Drawings indicate utilities or obstructions that are known to exist according to the best information available to the Owner. The Contractor shall call the agencies or departments that own and/or operate utilities in the vicinity of the construction work site at least 72 hours (three business days) prior to construction to verify the location of the existing utilities.
- B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.
 1. Provide the required notice to the utility owners and allow them to locate their facilities. Field utility locations are valid for only 10 days after original notice. The Contractor shall ensure, at the time of any excavation, that a valid utility location exists at the point of excavation.

2. Expose the facility, for a distance of at least 200 feet in advance of pipeline construction, to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.
3. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.
4. Maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The Contractor shall provide the Engineer an updated copy of the log bi-weekly, or more frequently if required.

C. Conflict with Existing Utilities

1. **Horizontal Conflict:** Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed water main does not permit safe installation of the water main by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or crossing facility. The Contractor may change the proposed alignment of the water main to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the Engineer. Where such relocation of the water main is denied by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.
2. **Vertical Conflict:** Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed water main does not permit the crossing without immediate or potential future damage to the utility, main, service, or the water main. The Contractor may change the proposed grade of the water main to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the Engineer. Where such relocation of the water main is denied by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.

- D. Electronic Locator:** Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

E. Water and Sewer Separation

1. Water mains should maintain a minimum 10 foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the 10 foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of 18-inches above the top of the sewer. Should neither of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of 18-inches.
2. The water main, when installed below the sewer, shall be encased in concrete with a minimum 6-inch concrete depth to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.
3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

3.02 CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS

- A. Install pipe lines and appurtenances along highways, streets and roadways in accordance with the applicable regulations of, and permits issued by, the Department of Transportation, Mason and Fleming Counties and the City of Flemingsburg with reference to construction operations, safety, traffic control, road maintenance and repair.
- B. Traffic Control
 1. The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public.
 2. Construction traffic control devices and their installation shall be in accordance with the current Manual On Uniform Traffic Control Devices for Streets and Highways.
 3. Placement and removal of construction traffic control devices shall be coordinated with the Department of Transportation, Mason and Fleming Counties and the City of Flemingsburg a minimum of 48 hours in advance of the activity.
 4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street

right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead", shall be removed and replaced when needed.

5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.
6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of the Department of Transportation, Mason and Fleming Counties and the City of Flemingsburg. Sign panels shall be of durable materials capable of maintaining their color, reflective character and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current Manual On Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to insure that they are maintained in the proper position throughout their period of use.

C. Construction Operations

1. Perform all work along highways, streets and roadways to minimize interference with traffic.
2. Stripping: Where the pipe line is laid along road right-of-way, strip and stockpile all sod, topsoil and other material suitable for right-of-way restoration.

Water Mains and Accessories

3. **Trenching, Laying and Backfilling:** Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.
 4. **Shaping:** Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.
 5. **Construction operations shall be limited to 400 feet along areas within KYDOT jurisdiction, including clean-up and utility exploration.**
- D. Excavated Materials:** Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement in a timely manner.
- E. Drainage Structures:** Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
- F. Landscaping Features:** Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.
- G. Maintaining Highways, Streets, Roadways and Driveways**
1. **Maintain streets, highways, roadways and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work.**
 2. **During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.**
 3. **Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. The grader or front-end loader shall be available at all times.**

4. Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the Work.

3.03 PIPE DISTRIBUTION

- A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.
- B. No pipe shall be strung further along the route than 1000 feet beyond the area in which the Contractor is actually working without written permission from the Owner.
- C. No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.
- D. No distributed pipe shall be placed inside drainage ditches.
- E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.

3.04 LOCATION AND GRADE

- A. The Drawings show the alignment of the water main and the location of valves, hydrants and other appurtenances.
- B. Construction Staking
 1. The base lines for locating the principal components of the work and a bench mark adjacent to the work are shown on the Drawings. Base lines shall be defined as the line to which the location of the water main is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or survey line. The Contractor shall be responsible for performing all survey work required for constructing the water main, including the establishment of base lines and any detail surveys needed for construction. This work shall include the staking out of permanent and temporary easements to insure that the Contractor is not deviating from the designated easements.
 2. The level of detail of survey required shall be that which the correct location of the water main can be established for construction and verified by the

Engineer. Where the location of components of the water main, e.g. tunnels and fittings, are not dimensioned, the establishment on the location of these components shall be based upon scaling these locations from the Drawings with relation to readily identifiable land marks, e.g., survey reference points, power poles, manholes, etc.

C. Reference Points

1. The Contractor shall take all precautions necessary, which includes, but is not necessarily limited to, installing reference points, in order to protect and preserve the centerline or baseline established by the Engineer.
 2. Reference points shall be placed, at or no more than three feet, from the outside of the construction easement or right-of-way. The location of the reference points shall be recorded in a log with a copy provided to the Engineer for use, prior to verifying reference point locations. Distances between reference points and the manhole centerlines shall be accurately measured to 0.01 foot.
 3. The Contractor shall give the Engineer reasonable notice that reference points are set. The reference point locations must be verified by the Engineer prior to commencing clearing and grubbing operations.
- D. After the Contractor locates and marks the water main centerline or baseline, the Contractor shall perform clearing and grubbing.**
- E. Construction shall begin at a connection location and proceed without interruption. Multiple construction sites shall not be permitted without written authorization from the Engineer for each site.**
- F. The Contractor shall be responsible for any damage done to reference points, base lines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, base lines, center lines and temporary bench marks as a result of the operations.**

3.05 LAYING AND JOINTING PIPE AND ACCESSORIES

- A. Lay all pipe and fittings to accurately conform to the lines and grades established by the Engineer.**
- B. Pipe Installation**

1. Proper implements, tools and facilities shall be provided for the safe performance of the Work. All pipe, fittings, valves and hydrants shall be lowered carefully into the trench by means of slings, ropes or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.
2. All pipe, fittings, valves, hydrants and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.
3. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe containing dirt shall be laid.
4. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.
5. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.
6. It is not mandatory to lay pipe with the bells facing the direction in which work is progressing.
7. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade, shall not be permitted.
8. Detection tape shall be buried 4 to 10-inches deep. Should detection tape need to be installed deeper, the Contractor shall provide 3-inch wide tape. In no case shall detection tape be buried greater than 20-inches from the finish grade surface.

C. Alignment and Gradient

1. Lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. Do not deflect any joint more than the maximum deflection recommended by the manufacturer.

2. Maintain a transit, level and accessories on the job to lay out angles and ensure that deflection allowances are not exceeded.
- D. **Expediting of Work:** Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug, either push-on, mechanical joint, restrained joint or as approved by the Engineer.
- E. **Joint Assembly**
1. Push-on, mechanical, flange and restrained type joints shall be assembled in accordance with the manufacturer's recommendations.
 2. The Contractor shall inspect each pipe joint within 200 feet on either side of main line valves to insure 100 percent seating of the pipe spigot, except as noted otherwise.
 3. Each restrained joint shall be inspected by the Contractor to ensure that it has been "homed" 100 percent.
 4. The Contractor shall internally inspect each pipe joint to insure proper assembly for pipe 24-inches in diameter and larger after the pipe has been brought to final alignment.
- F. **Cutting Pipe:** Cut ductile iron pipe using an abrasive wheel saw. Cut PVC pipe using a suitable saw; remove all burrs and smooth the end before jointing. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.
- G. **Polyethylene Encasement:** Installation shall be in accordance with AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape and all damaged areas shall be completely repaired to the satisfaction of the Engineer.
- H. **Valve and Fitting Installation**
1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of

pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be corrected or held for inspection by the Engineer. Valves shall be closed before being installed.

2. Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in this Section for cleaning, laying and joining pipe, except that 12-inch and larger valves shall be provided with special support, such as treated timbers, crushed stone, concrete pads or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.
3. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads will bear on the base and not on the valve or pipe. Extension stems shall be installed where depth of bury places the operating nut in excess of 30-inches beneath finished grade so as to set the top of the operating nut 30-inches below finished grade. The valve box cover shall be flush with the surface of the finished area or such other level as directed by the Engineer.
4. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.
5. A valve marker shall be provided for each underground valve. Unless otherwise detailed on the Drawings or directed by the Engineer, valve markers shall be installed 6-inches inside the right-of-way or easement.

I. Hydrant Installation

1. Prior to installation, inspect all hydrants for direction of opening, nozzle threading, operating nut and cap nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and cracks. Defective hydrants shall be corrected or held for inspection by the Engineer.
2. All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the roadway, with pumper nozzle facing the roadway,

except that hydrants having two-hose nozzles 90 degrees apart shall be set with each nozzle facing the roadway at an angle of 45 degrees.

3. Hydrants shall be set to the established grade, with the centerline of the lowest nozzle at least 12-inches above the ground or as directed by the Engineer.
4. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve. When a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing coarse gravel or crushed stone mixed with coarse sand from the bottom of the trench to at least 6-inches above the drain port opening in the hydrant to a distance of 12-inches around the elbow.
5. When a hydrant is set in clay or other impervious soil, a drainage pit 2 x 2 x 2 feet shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand under and around the elbow of the hydrant and to a level of 6-inches above the drain port.
6. Hydrants shall be located as shown on the Drawings or as directed by the Engineer. In the case of hydrants that are intended to fail at the ground-line joint upon vehicle impact, specific care must be taken to provide adequate soil resistance to avoid transmitting shock moment to the lower barrel and inlet connection. In loose or poor load bearing soil, this may be accomplished by pouring a concrete collar approximately 6-inches thick to a diameter of 24-inches at or near the ground line around the hydrant barrel.

3.06 CONNECTIONS TO WATER MAINS

- A. Make connections to existing pipe lines with tapping sleeves and valves, unless specifically shown otherwise on the Drawings.
- B. **Location:** Before laying pipe, locate the points of connection to existing water mains and uncover as necessary for the Engineer to confirm the nature of the connection to be made.
- C. **Interruption of Services:** Make connections to existing water mains only when system operations permit. Operate existing valves only with the specific authorization and direct supervision of the Owner.
- D. **Tapping Saddles and Tapping Sleeves**

1. Holes in the new pipe shall be machine cut, either in the field or at the factory. No torch cutting of holes shall be permitted.
 2. Prior to attaching the saddle or sleeve, the pipe shall be thoroughly cleaned, utilizing a brush and rag, as required.
 3. Before performing field machine cut, the watertightness of the saddle or sleeve assembly shall be pressure tested. The interior of the assembly shall be filled with water. An air compressor shall be attached, which will induce a test pressure as specified in this Section. No leakage shall be permitted for a period of five minutes.
 4. After attaching the saddle or sleeve to an existing main, but prior to making the tap, the interior of the assembly shall be disinfected. All surfaces to be exposed to potable water shall be swabbed or sprayed with a one percent hypochlorite solution.
- E. Connections Using Solid Sleeves: Where connections are shown on the Drawings using solid sleeves, the Contractor shall furnish materials and labor necessary to make the connection to the existing pipe line.
- F. Connections Using Couplings: Where connections are shown on the Drawings using couplings, the Contractor shall furnish materials and labor necessary to make the connection to the existing pipe line, including all necessary cutting, plugging and backfill.

3.07 VALVE BOX ADJUSTMENT (Not Used)

3.08 THRUST RESTRAINT

- A. Provide restraint at all points where hydraulic thrust may develop.
- B. Concrete Blocking
1. Provide concrete blocking for all bends, tees, valves, and other points where thrust may develop, except where other exclusive means of thrust restraint are specifically shown on the Drawings.
 2. Concrete shall be as specified in this Section.
 3. Form and pour concrete blocking at fittings as shown on the Drawings and as directed by the Engineer. Pour blocking against undisturbed earth. Increase dimensions when required by over excavation.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 02933

Seeding

PART 1 GENERAL

1.1 SCOPE

- A. The work covered by this section shall include the establishment of all ground cover including areas to be seeded and sodded. This work shall include the supply of all materials, labor, superintendence and maintenance as outlined in these specifications.
- B. The part of the site not covered by roads, walks, building, etc. shall be seeded according to these specifications. The areas to be sodded shall include a three foot strip immediately adjacent to all roads, walks, and structures, etc.

PART 2 PRODUCTS

2.1 LIME

- A. Agriculture lime shall be spread over the entire area to be planted at an average rate of one (1) ton per acre. One tillage operation shall incorporate both the lime and the fertilizer into the soil to a depth of four inches (4").

2.2 FERTILIZER

- A. Two fertilizer materials shall be applied to all areas to be seeded. The first shall be complete commercial fertilizer with 1:2:2 ratio of nitrogen, phosphorus, and potassium. Eight hundred pounds (800 lbs) per acre of a 6-12-12 fertilizer, or equivalent amount of another 1:2:2 ratio fertilizer shall be used.
- B. In addition to a complete fertilizer, a slowly available nitrogen fertilizer shall be applied. Two hundred fifty pounds (250 lbs.) per acre of urea formaldehyde (38-0-0) shall be used.
- C. Both fertilizer materials shall be free flowing and suitable for application with approved equipment. Each material shall conform to State fertilizer laws. Bagged fertilizer shall be delivered in sealed standard containers and shall bear the name, trademark, and warranty of the producer. The fertilizers shall be incorporated into the surface four inches (4") by tillage.

2.3 SEED

- A. Grass seed shall be fresh, clean and new crop seed composed of the following varieties mixed in the proportion by weight as shown and shall be certified as to varietal purity. All seed shall be mixed by a dealer furnished in sealed standard containers, and tagged with the dealer's guaranteed statement of composition of mixture and percentage of purity and germination. All areas disturbed by construction activity shall be seeded within the following blend at a rate of two hundred pounds (200 lbs.) per acre (4.6 pounds per 1000 square feet).
- B. The quality of seed shall conform to or exceed the minimum requirement for seed quality of the Kentucky Seed Improvement Association and shall meet or exceed the following standards for purity and germination:

Variety	Min% Purity/Germ	Wt.%	Seeding Rate Pounds Per Acre
Kentucky Bluegrass-Kenblue	98/80	20	40
Creeping Red Fescue-Pennlawn	98/85	70	140
Perennial Ryegrass	95/90	10	20

2.4 MULCH

- A. Mulch for hydroseeding shall be natural wood cellulose fiber or wood pulp which disperses readily in water and which has no toxic effect when combined with seed or other materials. It shall be a commercially available product made for use in spray applicators. Wood cellulose mulch shall be applied at a rate of 1000 lbs. per acre when work is done in the spring or fall season as defined below and 1500 pounds per acre when work is done during summer months.

2.5 SOD

- A. Sod shall be bluegrass sod strongly rooted and free of pernicious weeds. It shall be a uniform thickness of not more than 1 1/2" and shall have not less than 3/4" of soil. All sod shall be grown on a commercial turf farm and no pasture sod shall be acceptable. The source of the sod must be approved by the Engineer before it is cut for delivery.

PART 3 EXECUTION

3.1 PLANTING SEASON

- A. The normal seasonal dates for seeding mixtures containing Kentucky Bluegrass or tall fescue shall be August 15 to October 15 and from the time the soil is workable in the spring to May 1. Seeding of a specified grass variety at times other than the normal seasonal dates must be approved by the Engineer. Seeding shall not be done during windy weather or when the ground is excessively wet, frozen or otherwise untillable.

3.2 SOIL PREPARATION

- A. All areas shall be graded to surface drain as shown on the plans. The lime and fertilizer shall be applied at the rates specified above and tilled into the surface 4 inches with approved tillage equipment to provide a reasonably firm, but friable seedbed.
- B. All areas to be seeded or sodded shall meet the specified grades, and be free of any weed or undesirable plant growth or debris.
- C. Lime and fertilizer for all areas shall be applied at the rate specified and incorporated into the top four inches by approved tillage equipment. The seed and wood cellulose mulch shall then be mixed with adequate water to produce a slurry and then applied uniformly with a hydroseeder at the rates specified above. Any area inadequately covered shall be redone as directed by the Engineer.

3.3 MAINTENANCE OF SEEDED AREAS:

- A. The Contractor shall maintain seeded areas until they have been mowed two times and then he shall repair eroded areas one time after the second mowing. Each mowing shall be when the grass is about four inches (4") high and cut back to about 2 1/2". After the second mowing, the Contractor shall notify the Engineer that he is ready to repair erosion damage so that an inspection can be scheduled when the erosion repair work is complete. Once the erosion areas have been filled with topsoil, fertilized, seeded and mulched and the work has been inspected and approved by the Engineer, the work under this section is complete. Any further erosion repair work necessary will be treated as an extra and shall be done only when authorized by the Engineer.

Cast-in-place Concrete

- B. Galvanized Reinforcing Bars: ASTM A 767 (ASTM A 767M), Class II [2.0 oz. zinc psf (610 g/sq. m)], hot-dip galvanized after fabrication and bending.
- C. Epoxy-Coated Reinforcing Bars: ASTM A 775 (ASTM A 775M).
- D. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- E. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- F. Deformed-Steel Welded Wire Fabric: ASTM A 497.
- G. Epoxy-Coated Welded Wire Fabric: ASTM A 884, Class A.
- H. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Use one brand of cement throughout Project.
- B. Fly Ash: ASTM C 618, Type F.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
 - 2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer..
- D. Lightweight Aggregates: ASTM C 330.

- E. Water: Potable.
- F. Fiber Reinforcement: Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III, not less than 3/4 inch long.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Gilco Fibers, Cormix Construction Chemicals.
 - b. Durafiber, Durafiber Corp.
 - c. Fiberstrand 100, Euclid Chemical Co.
 - d. Fibermesh, Fibermesh Co., Div. Synthetic Industries, Inc.
 - e. Forta, Forta Corp.
 - f. Grace Fibers, W.R. Grace & Co.
 - g. Polystrand, Metalcrete Industries
- G. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- H. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Air-Tite, Cormix Construction Chemicals.
 - b. Air-Mix or Perma-Air, Euclid Chemical Co.
 - c. Darex AEA or Daravair, W.R. Grace & Co.
 - d. MB-VR or Micro-Air, Master Builders, Inc.
 - e. Sealtight AEA, W.R. Meadows, Inc.
 - f. Sika AER, Sika Corp.
- I. Water-Reducing Admixture: ASTM C 494, Type A.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Chemtard, ChemMasters Corp.
 - b. PSI N, Cormix Construction Chemicals.
 - c. Eucon WR-75, Euclid Chemical Co.
 - d. WRDA, W.R. Grace & Co.

Cast-in-place Concrete

- e. Pozzolith Normal or Polyheed, Master Builders, Inc.
- f. Metco W.R., Metalcrete Industries.
- g. Prokrete-N, Prokrete Industries.
- h. Plastocrete 161, Sika Corp.

J. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Super P, Anti-Hydro Co., Inc.
 - b. Cormix 200, Cormix Construction Chemicals.
 - c. Eucon 37, Euclid Chemical Co.
 - d. WRDA 19 or Daracem, W.R. Grace & Co.
 - e. Rheobuild or Polyheed, Master Builders, Inc.
 - f. Superslump, Metalcrete Industries.
 - g. PSPL, Prokrete Industries.
 - h. Sikament 300, Sika Corp.

K. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Q-Set, Conspec Marketing & Manufacturing Co.
 - b. Lubricon NCA, Cormix Construction Chemicals.
 - c. Accelguard 80, Euclid Chemical Co.
 - d. Daraset, W.R. Grace & Co.
 - e. Pozzutec 20, Master Builders, Inc.
 - f. Accel-Set, Metalcrete Industries.

L. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. PSI-R Plus, Cormix Construction Chemicals.
 - b. Eucon Retarder 75, Euclid Chemical Co.
 - c. Daratard-17, W.R. Grace & Co.
 - d. Pozzolith R, Master Builders, Inc.
 - e. Protard, Prokrete Industries.
 - f. Plastiment, Sika Corporation.

2.4 RELATED MATERIALS

- A. **Reglets:** Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217- inch- (0.46-mm-) thick galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. **Dovetail Anchor Slots:** Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (0.76 mm) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.
- C. **Waterstops:** Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
- D. **Rubber Waterstops:** Corps of Engineers CRD-C 513.
 - 1. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - a. The Burke Co.
 - b. Progress Unlimited.
 - c. Williams Products, Inc.
- E. **Polyvinyl Chloride Waterstops:** Corps of Engineers CRD-C 572.
 - 1. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - a. The Burke Co.
 - b. Greenstreak Plastic Products Co.
 - c. W.R. Meadows, Inc.
 - d. Progress Unlimited.
 - e. Schlegel Corp.
 - f. Vinylex Corp.
- F. **Sand Cushion:** Clean, manufactured or natural sand.
- G. **Vapor Retarder:** Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

Cast-in-place Concrete

1. Polyethylene sheet not less than 8 mils (0.2 mm) thick.
- H. Vapor Barrier: Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic antistick sheet. Water vapor transmission rate of 1 perm when tested according to ASTM E 96, Method B. Provide manufacturer's recommended mastics and gusset tape.
1. Product: Subject to compliance with requirements, provide Sealtight Premoulded Membrane by W.R. Meadows, Inc.
- I. Nonslip Aggregate Finish: Provide fused aluminum oxide granules or crushed emery as the abrasive aggregate for a nonslip finish, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, nonglazing, and unaffected by freezing, moisture, and cleaning materials.
- J. Colored Wear-Resistant Finish: Packaged dry combination of materials consisting of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground nonfading mineral oxides interground with cement. Color as selected by Owner from manufacturers' standards, unless otherwise indicated.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Conshake 600 Colortone, Conspec Marketing & Mfg. Co.
 - b. Floorcron, Cormix Construction Chemicals.
 - c. Quartz Tuff, Dayton-Superior.
 - d. Surfex, Euclid Chemical Co.
 - e. Colorundum, A.C. Horn, Inc.
 - f. Quartz Plate, L&M Construction Chemicals, Inc.
 - g. Colorcron, Master Builders, Inc.
 - h. Floor Quartz, Metalcrete Industries
 - i. Lithochrome Color Hardener, L.M. Scofield Co.
 - j. Harcol Redi-Mix, Sonneborn-Chemrex.
 - k. Hard Top, Symons Corp.
- K. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m), complying with AASHTO M 182, Class 2.
- L. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- M. **Liquid Membrane-Forming Curing Compound:** Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. m when applied at 200 sq. ft./gal (4.9 sq. m/L).
1. **Available Products:** Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. A-H 3 Way Sealer, Anti-Hydro Co., Inc.
 - b. Spartan-Cote, The Burke Co.
 - c. Conspec #1, Conspec Marketing & Mfg. Co.
 - d. Sealco 309, Cormix Construction Chemicals.
 - e. Day-Chem Cure and Seal, Dayton Superior Corp.
 - f. Eucocure, Euclid Chemical Co.
 - g. Horn Clear Seal, A.C. Horn, Inc.
 - h. L&M Cure R, L&M Construction Chemicals, Inc.
 - i. Masterkure, Master Builders, Inc.
 - j. CS-309, W.R. Meadows, Inc.
 - k. Seal N Kure, Metalcrete Industries.
 - l. Kure-N-Seal, Sonneborn-Chemrex.
 - m. Stontop CS2, Stonhard, Inc.
- N. **Water-Based Acrylic Membrane Curing Compound:** ASTM C 309, Type I, Class B.
1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
 2. **Available Products:** Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Highseal, Conspec Marketing and Mfg. Co.
 - b. Sealco - VOC, Cormix Construction Chemicals.
 - c. Safe Cure and Seal, Dayton Superior Corp.
 - d. Aqua-Cure, Euclid Chemical Co.
 - e. Dress & Seal WB, L&M Construction Chemicals, Inc.
 - f. Masterkure 100W, Master Builders, Inc.
 - g. Vocomp-20, W.R. Meadows, Inc.
 - h. Metcure, Metalcrete Industries.
 - i. Stontop CS1, Stonhard, Inc.

Cast-in-place Concrete

O. **Evaporation Control:** Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

1. **Available Products:** Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. Aquafilm, Conspec Marketing and Mfg. Co.
- b. Eucobar, Euclid Chemical Co.
- c. E-Con, L&M Construction Chemicals, Inc.
- d. Confilm, Master Builders, Inc.
- e. Waterhold, Metalcrete Industries.

P. **Underlayment Compound:** Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch (25 mm) thick to feathered edges.

1. **Available Products:** Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. K-15, Ardex, Inc.
- b. Self-Leveling Wear Topping, W.R. Bonsal Co.
- c. Conflow, Conspec Marketing and Mfg. Co.
- d. Corlevel, Cormix Construction Chemicals.
- e. LevelLayer II, Dayton Superior Corp.
- f. Flo-Top, Euclid Chemical Co.
- g. Gyp-Crete, Gyp-Crete Corp.
- h. Levelex, L&M Construction Chemicals, Inc.
- i. Underlayment 110, Master Builders, Inc.
- j. Stoncrete UL1, Stonhard, Inc.
- k. Concrete Top, Symons Corp.
- l. Thoro Underlayment Self-Leveling, Thoro System Products.

Q. **Bonding Agent:** Polyvinyl acetate or acrylic base.

1. **Available Products:** Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. **Polyvinyl Acetate (Interior Only):**
 - 1) Superior Concrete Bonder, Dayton Superior Corp.
 - 2) Euco Weld, Euclid Chemical Co.
 - 3) Weld-Crete, Larsen Products Corp.

- 4) Everweld, L&M Construction Chemicals, Inc.
- 5) Herculox, Metalcrete Industries.
- 6) Ready Bond, Symons Corp.

b. Acrylic or Styrene Butadiene:

- 1) Acrylic Bondcrete, The Burke Co.
- 2) Strongbond, Conspec Marketing and Mfg. Co.
- 3) Day-Chem Ad Bond, Dayton Superior Corp.
- 4) SBR Latex, Euclid Chemical Co.
- 5) Daraweld C, W.R. Grace & Co.
- 6) Hornweld, A.C. Horn, Inc.
- 7) Everbond, L&M Construction Chemicals, Inc.
- 8) Acryl-Set, Master Builders Inc.
- 9) Intralok, W.R. Meadows, Inc.
- 10) Acrylpave, Metalcrete Industries.
- 11) Sonocrete, Sonneborn-Chemrex.
- 12) Stonlock LB2, Stonhard, Inc.
- 13) Strong Bond, Symons Corp.

R. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. Burke Epoxy M.V., The Burke Co.
- b. Spec-Bond 100, Conspec Marketing and Mfg. Co.
- c. Resi-Bond (J-58), Dayton Superior.
- d. Euco Epoxy System #452 or #620, Euclid Chemical Co.
- e. Epoxite Binder 2390, A.C. Horn, Inc.
- f. Epabond, L&M Construction Chemicals, Inc.
- g. Concessive Standard Liquid, Master Builders, Inc.
- h. Rezi-Weld 1000, W.R. Meadows, Inc.
- i. Metco Hi-Mod Epoxy, Metalcrete Industries.
- j. Sikadur 32 Hi-Mod, Sika Corp.
- k. Stonset LV5, Stonhard, Inc.
- l. R-600 Series, Symons Corp.

2.5 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial

Cast-in-place Concrete

batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

1. Do not use the same testing agency for field quality control testing.
 2. Limit use of fly ash to not exceed 25 percent of cement content by weight.
- B. Submit written reports to Engineer of each proposed mix for each class of concrete prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed.
- C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
1. 4000 psi (27.6 MPa), 28-day compressive strength; water-cement ratio, 0.44 maximum (non-air-entrained), 0.35 maximum (air-entrained).
- D. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
1. Subjected to freezing and thawing: W/C 0.45.
 2. Subjected to deicers/watertight: W/C 0.40.
 3. Subjected to brackish water, salt spray, or deicers: W/C 0.40.
- E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs, and sloping surfaces: Not more than 3 inches (75 mm).
 2. Reinforced foundation systems: Not less than 1 inch (25 mm) and not more than 3 inches (75 mm).
 3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches (200 mm) after adding admixture to site-verified 2 - 3 inch (50 - 75 mm) slump concrete.
 4. Other concrete: Not more than 4 inches (100 mm).
- F. Lightweight Structural Concrete: Lightweight aggregate and concrete shall conform to ASTM C 330. Proportion mix to produce concrete with a minimum compressive strength of 3000 psi (20.7) at 28 days and a calculated equilibrium unit weight of 110 pcf (1762 kg/cu. m) plus or minus 3 pcf (48.1 kg/cu. m) as determined by ASTM C 567. Concrete slump at the point of placement shall be the minimum necessary for efficient mixing, placing, and finishing. Maximum slump shall be 6 inches (150 mm) for pumped

concrete and 5 inches (125 mm) elsewhere. Air entrain concrete exposed to weather according to ACI 301 requirements.

- G. **Adjustment to Concrete Mixes:** Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in Work.
- H. **Fiber Reinforcement:** Add at manufacturer's recommended rate but not less than 1.5 lb/cu. yd. (0.9 kg/cu. m).

2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.
- D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2 inch (38 mm) maximum aggregate.
 - b. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1 inch (25 mm) maximum aggregate.
 - c. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4 inch (19 mm) maximum aggregate.
 - d. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2 inch (13 mm) maximum aggregate.
 - 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to

- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended mastic or pressure-sensitive tape.
 - 1. Cover vapor retarder/barrier with sand cushion and compact to depth indicated.

3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
 - 1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

Cast-in-place Concrete

a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

- C. **Smooth-Rubbed Finish:** Unless otherwise shown or scheduled, provide smooth-rubbed finish on all exposed, vertical concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. **Grout-Cleaned Finish:** Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
1. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. **Related Unformed Surfaces:** At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

- A. **Scratch Finish:** Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155 (ASTM E 1155M). Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

- B. **Float Finish:** Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155 (ASTM E 1155M). Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. **Trowel Finish:** Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155 (ASTM E 1155M). Grind smooth any surface defects that would telegraph through applied floor covering system.
- D. **Trowel and Fine Broom Finish:** Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
- E. **Nonslip Broom Finish:** Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with before application.
- F. **Nonslip Aggregate Finish:** Apply nonslip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and where indicated.
1. After completing float finishing and before starting trowel finish, uniformly spread dampened nonslip aggregate at a rate of 25 lb per 100 sq. ft. (12 kg/10 sq. m) of

Cast-in-place Concrete

surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.

2. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose nonslip aggregate.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. **Filling In:** Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. **Curbs:** Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. **Equipment Bases and Foundations:** Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. **Steel Pan Stairs:** Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.12 CONCRETE CURING AND PROTECTION

- A. **General:** Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. **Curing Methods:** Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

- D. Provide moisture curing by the following methods:
1. Keep concrete surface continuously wet by covering with water.
 2. Use continuous water-fog spray.
 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4 inch (100 mm) lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches (75 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 SHORES AND SUPPORTS

- A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.

Cast-in-place Concrete

- B. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted.
- C. Extend shoring at least three floors under floor or roof being placed for structures over four stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.
- D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.
- E. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.14 REMOVING FORMS

- A. **General:** Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.15 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable.

3.16 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh (1.2 mm) sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch (6 mm) in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch (25 mm). Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Owner. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

Cast-in-place Concrete

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch (25 mm) in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch (25 mm) or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.17 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. **General:** The Owner will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Engineer.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. (4 cu. m) plus additional sets for each 50 cu. yd. (38 cu. m) more than the first 25 cu. yd. (19 cu. m) of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 3. When total quantity of a given class of concrete is less than 50 cu. yd. (38 cu. m), Engineer may waive strength testing if adequate evidence of satisfactory strength is provided.
 4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi (3.4 MPa).
- C. Test results will be reported in writing to Engineer within 3 days. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-

Cast-in-place Concrete

day tests and 28-day tests.

- D. **Nondestructive Testing:** Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. **Additional Tests:** The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

SECTION 03310
FLOWABLE FILL CONCRETE

PART 1 GENERAL

1.1 DESCRIPTION

Flowable fill is a low strength mixture of portland cement, sand, Class F fly ash, and water. It is proportioned to flow under and around the pipe requiring no compaction and little or no finishing. Flowable fill may be used by the Contractor as backfill material for pipe. When using flowable fill with aluminum pipe, an approved means of separation must be provided, such as bituminous coating.

PART 2 PRODUCT

2.2 MATERIALS

Ingredient materials shall meet the requirements specified in the following sections of the Standard Specifications:

Portland Cement, Type I	801
Sand	804
Fly Ash, Class F	844
Water	803

The flowable fill shall be initially mixed in the following proportions per cubic yard:

Cement (Minimum)	40 lbs.
Fly Ash	300 lbs.
Sand (SSD)	3000 lbs.
Water (Maximum)	550 lbs.

To expedite settlement of the flowable fill it will be necessary for bleed water to appear on the surface within 5 to 10 minutes after placement. A delay in bleeding indicates there are too many fines in the mixture or insufficient water. If the maximum water was added, the fly ash quantity shall be reduced in increments of 50 lbs. until mixture is bleeding freely. Approximately 60 lbs. of sand shall be added to replace each 50 lbs. increment of fly ash to maintain the original yield. The flowable fill is too dry when cracks develop as it flows into place.

A set of test cylinders shall be cast for each 300 cubic yards of flowable fill. Cylinders shall not be rodded, but the sides of the mold shall be tapped lightly after each layer. The test cylinders should be allowed to bleed for about 30 minutes, refilled, and then covered with a sheet of tough durable impervious plastic. Secure the plastic in place around the mold,

within one inch of the top, with a rubber band or string prior to covering with wet burlap. Remove the burlap after 24 hours and cure at 60° F to 90° F, in the shade, until 28 days old. Then remove the plastic covering and mold and perform compressive strength test. The average of the 28 days compressive strength tests is expected to be approximately 50 PSI.

PART 3 EXECUTION

3.3 CONSTRUCTION

Flowable fill shall be delivered in a revolving drum truck mixer conforming to Section 601 to insure that the mixture is in suspension when placed. Agitation is required during transportation and waiting time. Subsidence may occur if the mixture is not agitated. Normally, a trench can be backfilled directly from the truck chute or a pump may be used.

The flowable fill may extend from the top of the compacted bedding to the bottom of the pavement structure. Flowable fill shall be a minimum of 2 hours of age prior to the addition and compaction of any material above it.

When flowable fill is used, the Contractor may reduce the trench width to a minimum of 6 inches clear on each side of the pipe. Standing water in the trench does not have to be pumped out before backfilling with flowable fill.

Certain types of pipe may float, therefore backfilling may have to be done in lifts or else the pipe will need to be anchored. Backfilling in lifts is generally more applicable to long lines of pipe, allowing time for a substantial amount of the water to dissipate prior to applying the next lift. Anchors can be made of small lumber, metal straps, and must be adequately spaced. For larger diameter pipe, it may be possible to maintain a surge of flowable fill on top of the pipe to help prevent floating. Generally floating is not a problem after the level of the backfill is above the springline of the pipe. The contractor is responsible to take whatever action is necessary to insure that the pipe remains in the correct horizontal position and at the specified elevation.

END OF SECTION

SECTION 11200

Underground Packaged Booster Pump Station

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The contractor shall furnish and install one (1) factory built, factory delivered, underground water booster pump station, with all necessary internal piping, pumps, motors, valves and controls and other necessary appurtenances as shown on the plans and specified herein. The underground water booster station shall be complete when delivered and will not require internal contractor construction except to install the power service through the service conduit provided for that purpose.

1.02 SUBMITTALS

- A. Submit shop drawings and engineering data in accordance with the requirements of Section 01340 of these Specifications.
- B. Operation and maintenance manuals shall be furnished in accordance with the requirements of Section 01730 of these Specifications.

1.03 STORAGE AND PROTECTION

- A. Pump Station and accessories shall be stored and protected in accordance with the manufacturer's recommendations. Pump Stations shall not be stored outside or exposed to the weather.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

The underground water booster pump station shall be manufactured by Engineered Fluid, Inc. (EFI), Centralia, Illinois, represented by Mr. Jerry Delaney of Delaney and Associates, telephone (859)342-4944 or approved equal.

2.02 QUALITY ASSURANCE

The equipment and materials covered by these specifications are intended to be standard equipment of proven reliability and as manufactured by reputable manufacturers having experience in the production of such equipment. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the contract drawings and operated per manufacturer's recommendations.

It is intended that the manufacturer of the selected equipment shall be a business regularly engaged in the manufacture, assembly, construction, start-up and maintenance of

water distribution equipment of the type required for this project. The manufacturer shall have at least ten (10) years of successful experience in providing stations of the type, design, function and quality as required for this project. As such, the pump station manufacturer shall be required to affix an UNDERWRITERS LABORATORIES (UL) LABEL attesting to the compliance of that assembled equipment under the PACKAGED PUMPING SYSTEMS (QCZJ) UL Listing Category. This label shall be inclusive of the entire station with enclosure so as to demonstrate compliance with the National Electrical Code requirements for working clearances and wiring procedures. Equipment manufactured without this third party certification label or equipment manufactured by an outside source or "brokered equipment" defined as systems not assembled on the premises of the named manufacturer by that company's employees WILL NOT be allowed.

2.03 EQUIPMENT CAPSULE

The equipment capsule size as shown on the drawings for this project is appropriate for National Standard mandated clearances and for proper clearances above, below and around equipment to provide for safe servicing, removal and reinstallation of that equipment.

Likewise, the entrance manway and/or equipment hatches shall be sized to provide for the eventual removal and replacement of any component within the station without altering the station to accomplish that task.

The drawing for this equipment illustrates centerline and clearance/maintenance dimensions about major equipment items. These dimensions are minimum. Dimensions less than those shown **will not** be accepted.

2.04 EQUIPMENT CAPSULE - CONSTRUCTION

The plate steel employed throughout the capsule shall be 1/4" minimum thickness and meet or exceed the requirements for ASTM A-36. The structural shapes (channels and angles) shall be of the thickness/weight as shown on the plans for this item and shall meet or exceed the requirements for ASTM A-36. The structural rectangular or square tubing shall be of the wall gauge as shown on the plans for this item and shall meet or exceed the requirements for ASTM A-500 Grade B. Field welding to complete the capsule or attach the entrance hatch will not be allowed.

The plate forming the top and bottom of the capsule shall be cold formed prior to assembly so as to form a lap joint with the side wall. The lap joint shall be continuously welded on the interior by hand and the exterior by machine to form an airtight seal. The lower side wall continuous weld shall be an average 1_ inches above the capsule floor, which removes the lower weld from incidental water impingement. Capsules without lap joints will not be accepted.

The lap joint shall be in full conformance with Steel Tank Institute (STI) P-3 specifications Section 4.2.6 and Underwriters Laboratories (UL) 58 specifications for steel vessels in

buried service, and the American Welding Society (AWS) Structural Welding Code, Section 9.10, for dynamically loaded structures.

Any ferrous metal device passing through the capsule wall will be welded fully along its circumference or length on both sides of the capsule wall.

The capsule shall be a rolled, vertical cylinder and have an outside diameter of 13 feet 0 inches and an inside clear height of 7 feet 3 inches.

The top and bottom of the equipment capsule shall be supported and reinforced by a combination of standard structural shapes of the sizes and weights as shown on the plans for this item.

Four (4) or more lifting plates of 3/8 inch minimum thickness shall be placed about the perimeter of the capsule to facilitate the lifting and handling of the station.

Interior lifting eyes shall be placed over each piece of equipment in excess of 60 pounds in weight.

The capsule will be complete with a sump. The sump shall be a minimum of eighteen (18) inches in diameter by eight (8) inches deep; the sump shall be provided with a four (4) inch plugged outlet for gravity outflow as required.

2.05

ENTRANCE MANWAY

The entrance manway shall be Bilco Model MNB-50 roof scuttle, with a minimum clear inside opening of thirty (30) inches by fifty-four (54) inches. The scuttle cover shall be made of 11 gauge aluminum on the exterior. The scuttle cover shall be insulated with a minimum of one (1) inch of fiberglass insulation, covered and protected by an 18 gauge aluminum liner.

The entry lock shall be flush mounted, in the scuttle riser, in position to be protected from the elements by the cover skirt as detailed on Bilco Drawing 6184. The lock will be of the pin tumbler type, dead bolt, with an inside safety release. Two (2) keys will be provided, on a key ring complete with the manufacturer's identification. No locking devices or other penetrations of the cover shall be allowed.

2.06

ACCESS LADDER

An all aluminum access ladder will be provided. The ladder shall meet UL approval and OSHA qualifications under the Type I, Heavy Duty Specifications. The ladder will have 1-1/4" diameter, tempered, serrated rungs with 3" x 1-1/8" full I-Beam side rails. The uppermost ends of the side rails will be protected by plastic caps bolted into place. The complete access ladder will be bolted into place, at a minimum of two (2) points both top and bottom, so as to be easily removable to facilitate equipment maintenance.

2.07 SAFETY MATTING

The walkway areas (that space from the entrance ladder to the control panel and the entire NEC clearance area) shall be covered with a rubber drainage runner. The runner shall be medium duty, 1/2 inch minimum thickness of open slot design allowing fluids to drain under standing or walking surfaces. The runner shall have a tread design to promote sure footing. The underside of the runner shall have a raise knob design to permit aeration and drainage, and to reduce runner fatigue. The runner shall not be glued to the floor.

2.08 CORROSION PROTECTION

All surfaces of the entire structure shall be gritblasted equal to commercial blast cleaning (SSPC-SP6).

Following grit blasting, all weldments will be pretreated by hand with brush using Tnemec Series 69 Hi-Build Epoxoline II coating to provide additional corrosion protection. Following the pretreatment full coating application shall take place.

The full protective coating shall take place immediately after surface preparation. The protective coating shall be Tnemec Series 69 Hi-Build Epoxoline II consisting of a two-component, high solids, epoxy system formulated for high build application for protection and finishing of steel and having excellent chemical and corrosion resistant properties. The epoxy system shall be self-priming and require no intermediate coatings. The protective coating shall provide in two (2) applications a total dry mil thickness of 8.0 mils.

The station manufacturer shall furnish four (4) seventeen pound packaged magnesium anodes for cathodic protection. The anodes shall be buried equally spaced around the station and connected by heavy copper wire to lugs on the station provided for that purpose.

2.09 OPERATING CONDITIONS

The pump station shall be capable of delivering the fluid medium at the following capacities and heads when operating at 0 feet minimum suction pressure.

PUMP #1

Design GPM 300 @ 95 feet TDH;
Maximum GPM 400 @ 40 feet TDH;
Efficiency at design GPM 75.5 %.

The pump driver shall be a standard, A.C. induction motor, open drip-proof construction, of the horizontal extended shaft, normal thrust type and shall be 15 h.p., 3500 rpm nominal and suitable for 3 phase, 60 cycle, 480 volt electrical service.

The pump motor shall be sized so that the nameplate horsepower rating, without consideration of the service factor, **shall not** be exceeded at any point along the pump performance profile. The pump motor shall be complete with a 1.15 service factor.

2.10 BOOSTER PUMPS – HORIZONTAL END SUCTION, CENTRIFUGAL TYPE

The pumps employed within the pump station shall be of the horizontal end suction, centrifugal type. The pumps shall be of close grain cast iron construction complete with bronze trim. The pumps shall conform to the detailed specifications as set forth below:

CASING - Volute type, bolted to adapter, with recessed lock fit to insure alignment. No stud or bolt holes are tapped through casing to liquid ways. Tapping openings provided for priming, venting, draining and suction and discharge gauge connections. Piping connection to be as shown per pump data sheets.

IMPELLER - Enclosed, single suction type, cast in one piece. All impellers are to be statically balanced to insure smooth operation, also hydraulically balanced except in some small sizes where end thrust is but a minor factor.

WEARING RINGS - Renewable type; maintain proper running clearance with impeller hubs to minimize leakage between suction and discharge.

SHAFT SLEEVES - To be shouldered on shaft near impeller and covers full length of shaft from impeller hub to motor end bracket. Seals by compression between shaft sleeve and impeller hub, also between sleeve and shoulder on shaft, protecting shaft from contact with liquid.

STUFFING BOX - The stuffing box shall be cast integral with the pump casing. The stuffing box shall contain a single face type mechanical seal. The seal shall have a carbon rotating head against a Ni-Resist stationary face and be complete with a Buna-N boot with stainless steel spring and spring retainer.

ADAPTER - Maintains rigid assembly between motor and casing. Machined lock between adapter and motor end bracket keeps adapter and casing in permanent alignment with motor and extended motor shaft.

MOTOR - Assembled as integral part of the complete units. Shaft carries impeller and sleeve. Motor bearings are ball bearing type, designed to carry all radial and thrust loads, and are installed in sealed housings which retain lubricant and exclude dirt and moisture. Motors shall be open drip proof.

THE BOOSTER PUMPS SHALL BE PEERLESS MODEL C620A.

2.11 PUMP/MOTOR VIBRATION ISOLATION PADS

The pump/motor assembly shall be mounted to a fabricated steel base built specifically for the pump/motor to be mounted. Each mounting or attachment point shall be complete with a vibration isolation pad. The pad will be in two (2) parts, a 1/4" base layer followed by a 5/8" upper layer and be a nominal 2" x 2" square size for pump/motor combinations weighing up to 1500 pounds.

2.12 ELASTOMER PIPE CONNECTOR

The inlet side of each booster pump shall include an elastomer connector to help isolate vibration and noise in the piping system. The elastomer connector shall be of single sphere design, constructed of neoprene and nylon with bias-ply tire reinforcing cord to provide a 225 psi working pressure rating to a minimum of 120°F. The elastomer connector shall pass through the plate steel flanges designed to grip the connector so the connector seals without gaskets when the flange bolts are drawn up.

A control joint limiting pipe connector movement shall be supplied with each pipe connector.

2.13 PIPING

Piping shall be steel and conform to material specification ASTM A-53(CW) for nominal pipe size four (4) inch and smaller and ASTM A-53(ERW) Grade B for nominal pipe size five (5) inches and larger. Steel butt-welding fittings shall conform to material specification ASTM A-234 Grade WPB and to the dimensions and tolerances of ANSI Standards B16.9 and B16.28 respectively.

Forged steel flanges shall conform to material specification ASTM A-105 Class 60 and/or ASTM A-181 for carbon steel forgings and to the dimensions and tolerances of ANSI Standards B16.5 as amended in 1992 for Class 150 and Class 300 flanges.

The piping sizes shall be as shown on the drawing.
Size 10 inch and below - Schedule 40
Size 12 inch and above - Standard weight (.375" wall)

All pipe welds shall be performed by certified welders employed by the pump station manufacturer. As part of the equipment submittal, the pump station manufacturer shall provide copies of the welding certificates of the employees who are to perform the pipe welds.

All piping surfaces shall be prepared by sandblasting, or other abrasive blasting, prior to any welds taking place. Piping of 5" diameter and smaller may be cut by saw. Piping of 6" diameter and larger shall be bevel cut, and Oxyfuel or Plasma-arc cutting techniques shall be used to assure and facilitate bevel pipe cuts. No saw cuts or other form of abrasive cut-offs are allowed on 6" and larger diameter pipe.

In all cases, short circuit transfer, spray transfer or pulse-arc transfer modes of the gas metal arc welding process shall be applied semi-automatically. When utilizing the short circuit mode, shielding gas consisting of 50% carbon dioxide and 50% argon gas shall be used. When utilizing the spray or pulse-arc transfer modes, a shielding gas consisting of 5% carbon dioxide and 95% argon shall be used. In all cases, welding wire with a minimum tensile strength of 70,000 psi shall be employed. All flange welds and butt welds of equal size pipe shall be a single continuous nonstop weld around the complete circumference of the pipe. Whenever possible, vertical up weld passes will be applied to all pipe welds. No vertical down weld passes will be allowed. Completed welding assemblies shall create no internal obstruction, restriction or create any unintended sources of water deflection.

Piping of six (6) inch diameter and larger shall require a minimum of two (2) weld passes to complete each weld. The first pass, or root pass, shall be applied at the bottom of the bevel cut using the short circuit transfer welding mode, and the second pass, or cap pass, shall be applied over the root pass using the spray or pulse arc transfer welding modes to insure that at a minimum the total weld thickness shall be equal to thinnest of the two pieces being welded together.

2.14 PIPE SUPPORTS

Pipe supports by minimum sizing for:

- 8" and smaller piping shall be 2" x 3" x 3/16" wall rectangular tubing;
- 10" and larger piping shall be 3" x 4" x 1/4" wall rectangular tubing;
- 6" and larger piping shall be provided with kick bracing projecting fully from the underside of the pipe to the floor at an angle of no less than 15° from vertical out at a right angle to the run of the pipe being supported. These kick braces shall be in addition to the vertical pipe supports called out above.

Pipe supports are to be fully welded at both end points to the pipe and steel floor where required.

Simple pipe stands made of pipe welded only at the floor and upholding a bracket with or without a threaded jack bolt or a U-bolt are not acceptable, as no lateral or transverse support is provided.

2.15 FUSION BONDED EPOXY COATING – STEEL PIPING

Steel piping shall have applied to it a Fusion Bonded Epoxy Coating on the interior pipe surface that conforms to AWWA C-213-91 for steel water pipelines. The powder coating product shall be National Sanitation Foundation (NSF) Standard 61 certified material. The final product shall be capable of meeting Salt Spray Resistance ASTM B117 (1000 hour) with no blistering, undercutting or rust bleed; Humidity Resistance ASTM D2247 (1000 hour) with no blistering, undercutting or rust bleed; and Impact Resistance of ASTM G14-72 (160 in. lbs.). The Fusion Bonded Epoxy Coating shall provide a minimum total dry mil thickness of

12-16 mils. The epoxy powder coating shall be Pipe Clad_ 1500 Red latest revision from Valspar, Inc.

Repairs to scratches and/or damaged areas of the Fusion Bonded Epoxy Coating shall be made with Valspar, Inc. Pipe Clad patch compound 920C970+920R970. Wire brush or sandblast the damaged area and lightly abrade or sandblast the coating on the sides of the damaged area before applying the repair coating. Repaired areas shall overlap the base coating a minimum of _ inch. Apply the repair coating to a minimum dry mil thickness of 12-16 mils. The patch compound cannot be used as a replacement for electrostatically applied Fusion Bonded Epoxy Coating and is intended for use only in repair of damage to Fusion Bonded Epoxy Coating.

Prior to shipment of the station, the station manufacturer shall provide in writing to the Engineer certification that the fusion bonded epoxy coating has been applied to all internal surfaces of the steel piping using the proper method. Said certification shall show under the station manufacturer's letterhead:

- Date of application;
- Material manufacturer and product designation including a product data sheet for the coating;
- Applier of the fusion bonded coating, name, address and phone number;
- Notarized signature of an officer of the station manufacturing company stating the fusion bonded epoxy coating was applied to AWWA Standard C213-91 or the latest revision.

2.16 TANK PENETRATION SLEEVE

Tank wall penetrations for all pipes with interior epoxy fusion bonded coating shall include a tank penetration sleeve of at least 1/2 inch thickness. This sleeve shall be attached to the pipes prior to epoxy coating. The sleeve shall prevent destruction of the pipe coating at weld locations. This sleeve shall be shown on submittal drawings.

2.17 SERVICE CONNECTIONS ON INTERNAL PIPING

All plumbed devices within the station eventually requiring service, such as meters, control valves, pumps and like equipment, shall be easily removed from the piping by the presence of appropriately placed and sufficient quantity of adaptors and couplings as shown on the drawings; no less than the quantity of couplings and adaptors shown shall be allowed.

2.18 RESTRAINING POINTS

The main inlet and outlet piping to the station shall each be provided with two (2) or four (4) restraining points as welded on "eyes" or similar device welded to the capsule or framing to facilitate the attachment of joint restraint tie rods or other device to be used in retarding any pipe movement at the connections.

2.19 COMPRESSION COUPLINGS

The booster station piping shall include a compression type, flexible coupling to prevent binding and facilitate removal of associated equipment where shown on the plans for this item. In lieu of a compression coupling, a Uni-Flange or a flanged coupling adapter (FCA) may be used.

All compression couplings, Uni-Flanges, flanged coupling adapters (FCA), and flexible connectors/expansion joints shall include a minimum of two (2) control joint rods with appropriate restraining points.

2.20 COMBINATION PRESSURE GAUGES

Combination pressure gauges shall have a built-in pressure snubber and 4-1/2 inch minimum diameter faces and be turret style, black phenolic case with clear glass face. The movement shall be rotary, of 400 Series stainless steel with teflon coated pinion gear and segment. The gauge shall be bottom connected and accept a 1/4" NPT female thread. Combination pressure gauge range and scale graduations shall be in psi and feet of water as follows:

SUCTION PRESSURE - 0 to 160 psi, 20 psi figure intervals, with graduating marks every 2 psi (0-370 feet).

DISCHARGE PRESSURE - 0 to 300 psi, 25 psi figure intervals, with graduating marks every 5 psi (0-690 feet).

All gauges will be panel mounted off the pipeline and be flexible connected to their respective sensing point. The gauge trim tubing shall be complete with both isolating and vent valves and the tubing shall be so arranged as to easily vent air and facilitate gauge removal. Gauges mounted directly to the pipeline or at the sensing point will not be accepted.

GAUGES SHALL BE ASHCROFT DURAGAUGE PLUS MODEL 1279XLL.

2.21 SAMPLE TAP

A single, right angle outlet, smooth nose, brass sample tap shall be affixed to the manual vent ball valve for the low suction lockout and suction pressure gauge assembly.

2.22 BUTTERFLY VALVES

Valve body shall be wafer style and meet ANSI Class 125/150 flange standards. The metal reinforced dovetail seat shall ensure drop tight, bi-directional shutoff. The stem shall be one piece. The disc and stem shall be connected by a stainless steel torque plug which shall provide positive engagement. The valve shall have upper and lower RTFE inboard stem

bearings, isolated from the line media, and a heavy-duty upper stem bushing.

The valve body shall be cast iron; aluminum bronze disc; stainless steel stem; EPDM seat; acetal upper stem bushing; Buna-N V-cup stem seal.

Valves sized six (6) inches and smaller shall be equipped with lever operator and 10 degree increment throttling plate. Valves sized eight (8) inches and larger shall be equipped with a weather-proof, heavy-duty, gear operator complete with a position indicator.

BUTTERFLY VALVES SHALL BE KEYSTONE MODEL 221-784.

2.23 NON-SLAM CHECK VALVES

Each pump discharge pipe run shall include a wafer-type, non-slam check valve. The body of the check valve shall be cast iron. The plug and seat shall be bronze and conform to ASTM Designation B-584. The seat shall contain a Buna-N seal to provide zero leakage. The seal design shall provide for both a metal to metal low and high pressure without over-loading or damaging the Buna-N seal. The guide bushings shall be bronze copper alloy and conform to ASTM Designation B-584. The valve spring and seat retainers shall be stainless steel and conform to ASTM Designation A-313. The valve plug shall be guided at both ends by a center shaft integral with the valve plug. Alignment of the center shaft shall be provided by guide bushings.

NON-SLAM CHECK VALVES SHALL BE VAL-MATIC SERIES 1400-BN.

2.24 GATE VALVE

The meter inlet isolating valve where shown and as sized on the plan sheet covering this item shall be a gate valve meeting or exceeding AWWA Standard C-500. The gate valve will be cast iron body, bronze mounted, resilient seat, NRS (non-rising stem). The valve will be flanged pattern with flange and drilling complying to ANSI B16.1, Class 125. The valve will be complete with handwheel operator and shall be constructed so as to open left (counter-clockwise). Maximum working pressure shall be 200 psi.

THE GATE VALVE SHALL BE M&H VALVE MODEL 4067-02.

2.25 WATER METER & STRAINER

The booster pump station shall include a turbine type meter, size six (6) inch. The turbine meter shall be flanged and shall conform to ANSI Class 125.

THE METER/STRAINER ASSEMBLY SHALL BE A BADGER TURBO WITH REMOTE ELECTRONIC REGISTER FOR USE OF PUMP CONTROL AND REMOTE READ.

2.26 METER TEST PORT

The meter installation shall be complete with a meter test port as shown on the plans for this item. The test port shall consist of a NPT coupling in the pipe downstream of the meter capable of accommodating a threaded by hose connection adapter. The connection shall be plugged.

2.27 PRESSURE TESTING

When the station plumbing is completed, the pressure piping within the station, including valves, pumps, control valves, fittings, connections as make up the entire system shall be hydrostatically tested at a pressure of 150 psi or a pressure equal to the lowest test pressure rating of the equipment within the tested system, whichever is lesser pressure. The test pressure shall be applied for a minimum of 20 minutes, during which time all joints, connections and seams shall be checked for leaking. Any deficiencies found shall be repaired and the system shall be retested.

The results of this testing shall be transmitted in writing to the Engineer prior to shipment of the station and shall note test pressure, time at full pressure and be signed by the Quality Control Manager or test technician.

2.28 ELECTRICAL APPARATUS – DESIGN, ASSEMBLY, & TEST

The electrical apparatus and control panel design, assembly, and installation, and the integration of component parts will be the responsibility of the manufacturer of record for this booster pumping equipment. That manufacturer shall maintain at his regular place of business a complete electrical design, assembly and test facility to assure continuity of electrical design with equipment application. Control panels designed, assembled or tested at other than the regular production facilities or by other than the regular production employees of the manufacturer of record for this booster pumping equipment will not be approved.

2.29 CONFORMANCE TO BASIC ELECTRICAL STANDARDS

The manufacturer of electrical control panels and their mounting and installation shall be done in strict accordance with the requirements of UL Standard 508 and the National Electrical Code (NEC) latest revision so as to afford a measure of security as to the ability of the eventual owner to safely operate the equipment. No exceptions to the requirements of these codes and standards will be allowed; failure to meet these requirements will be cause to remove the equipment and correct the violation.

2.30 U.L. LISTING

All service entrance, power distribution, control and starting equipment panels shall be constructed and installed in strict accordance with Underwriters Laboratories (UL)

Standard 508 "Industrial Control Equipment." An additional UL label shall include a SE "Service Entrance" rating certifying the panel in which the main power conductors terminate is suitable for use as service entrance equipment. The panels shall be shop inspected by UL, or constructed in a UL recognized facility. All panels shall bear a serialized UL label indicating acceptance under Standard 508 and under Enclosed Industrial Control Panel or Service Equipment Panel. In addition, a photocopy of the UL labels for this specific project shall be transmitted to both the project engineer and the contractor for installation within their permanent project files, prior to shipment of the equipment covered under these specifications.

2.31 E.T.L. LISTING

All control panels shall be E.T.L. Listed by Interek Testing Services (ITS) under Category 4 - Industrial Control Equipment. Each completed panel shall bear an E.T.L. listing label. The listing label shall include the station manufacturer's name, address and telephone number. The station manufacturer shall have quarterly inspections performed by ITS at the manufacturer's facilities to ensure that the products being listed comply with the report and procedural guide for that product.

2.32 EQUIPMENT GROUNDING

Each electrical equipment item in the station shall be properly grounded per Section 250 of the National Electrical Code. Items to be grounded include, but are not limited to, pump motor frames, control panel, transformer, convenience receptacles, dedicated receptacle for sump pump/dehumidifier, heater, lights, light switch, exhaust fans and pressure switches.

All ground wires from installed equipment shall be in conduit and shall lead back to the control panel to a plated aluminum ground buss specific for grounding purposes and so labeled. The ground buss shall be complete with a lug large enough to accept the installing electrician's bare copper earth ground wire. The bus shall serve as a bond between the earth ground and the equipment ground wires.

2.33 PANEL MOUNTING HARDWARE

Metal framing channel shall be used exclusively for mounting of all electrical panels and electrical components except for those specifically designated otherwise.

2.34 ELECTRICAL APPARATUS – CONTROL PANEL

All circuit breakers, motor starters, time delay relays and control relays shall be incorporated into one (1) NEMA 4/12 control panel. The electrical service provided for this station will be 480 volt, 3 phase, 60 cycle, 3 wire.

There shall be provided UL listed, molded-case, thermal-magnetic trip circuit breakers as follows:

- One (1) Main Breaker, 100 amps;
- Two (2) Branch Breakers, one each per pump, 45 amps;
- One (1) Transformer Breaker, Primary Side, 20 amps;
- One (1) Transformer Breaker, Secondary Side, 40 amps;
- One (1) Phase Monitor Breaker, 15 amps;
- Eight (8) Auxiliary Circuit Breakers, as follows:

- | | |
|----------------|---------------------------|
| 1. Controls | 5. Sump Pump/Dehumidifier |
| 2. Lights | 6. Spare |
| 3. Heater | 7. Convenience Outlets |
| 4. Exhaust Fan | 8. Telemetry |

2.35 ELECTRICAL APPARATUS – PUMP STARTING EQUIPMENT

Pump starting equipment shall be three (3) phase, full voltage non-reversing magnetic starters connecting the pump motor directly across the line. The relay shall be complete with a manually reset overload relay. The relay shall be complete with a correctly sized heater element on each line. Starters and overloads shall be UL listed.

2.36 ELECTRICAL APPARATUS – RUNNING TIME METER

A running time meter shall be supplied for each pump to show the number of hours of operation. The meter shall be enclosed in a dust and moisture proof molded plastic case, suitable for flush mounting on the main control panel. The meter dial shall register in hours and tenths of hours up to 99999.9 hours before repeating. The meter shall be suitable for operation from a 115 volt, 60 cycle supply.

2.37 ELECTRICAL APPARATUS – PHASE MONITOR

A phase monitor shall be supplied to protect three-phase equipment against phase loss, undervoltage and phase reversal conditions. When a fault is sensed, the monitor output relay opens within two seconds or less to turn the equipment off and/or cause an audio or visual alarm. Both Delta and Wye systems may be monitored. The monitor shall have an automatic reset and shall also include an adjustable voltage delay. The monitor shall have an indicator LED (glows when all conditions are normal and shall monitor phase sequence: ABC operate (will not operate CBA). The phase monitor shall be UL approved and CSA certified.

2.38 ELECTRICAL APPARATUS – SURGE ARRESTOR

A secondary surge arrestor shall be provided. Housing shall be Noryl and be ultrasonically sealed. Valve blocks shall be metal oxide with an insulating ceramic collar. Gap design

shall be annular. The lead wire shall be permanently crimped to the upper electrode forming part of the gap structure. Arrestors shall be UL and CSA listed Lightning Protective Devices.

2.39 ELECTRICAL APPARATUS – POWER TRANSFORMER

Balanced 115/230 single phase power for the auxiliary circuits within the scope of the booster station shall be obtained by use of a 7.5 KVA dry, step down transformer. The transformer shall be wall mounting type, in a NEMA 3R non-ventilated weatherproof enclosure. Transformer shall operate with noise levels equal to or less than ANSI and NEMA standards. Transformer insulation shall be Class 180c. The unit shall be "UL" approved for indoor/outdoor application.

2.40 ELECTRICAL APPARATUS – SUCTION PRESSURE CONTROL

Suction control of the pumping operation shall be provided by a bellows type, adjustable differential pressure switch. The switch shall be complete with a single pole, double throw contact block with 5 amp non-inductive rated contacts at 230 volts AC. The set points of the on/off cycle shall be independently adjustable through the full range of the switch rating.

1. Low Suction Cut-out, 4-150 psi.
- 1A. Adjustable Differential, 2-25 psi.

A pressure gauge shall be sub-panel mounted adjacent to the low suction pressure switch. The gauge and switch shall be so plumbed with the suction header sensing line that a common blow-off valve can relieve pressure in both simultaneously for purposes of checking and calibrating the low suction lock-out.

2.41 ELECTRICAL APPARATUS – TELEMETRY CONTROL – DESIGN, ASSEMBLY & TEST

The telemetry panel design, assembly, installation, and startup, and the integration of component parts will be the responsibility of the manufacturer of record for this booster pumping equipment. That manufacturer shall maintain at his regular place of business a complete telemetry design, assembly and test facility to assure continuity of control design with equipment application. Telemetry panels designed, assembled or tested at other than the regular production facilities or by other than the regular production employees of the manufacturer of record for this booster pumping equipment will not be approved.

2.42 ELECTRICAL APPARATUS – TELEMETRY CONTROL – INTERFACE PANEL

It will be the responsibility of the booster pump station manufacturer to provide the following as an adjunct to the supplied telemetry equipment.

1. 3/4" telemetry entrance conduit complete to telemetry panel.
2. Size 12" x 12" NEMA 1 telemetry interface panel.
3. Separate 120 volt single phase power circuit in conduit to the telemetry interface panel.
4. Telemetry control circuits made up and in conduit from main control panel to telemetry interface panel terminal strip.
5. Brackets to mount telemetry equipment.

2.43**ELECTRICAL APPARATUS – DEVICES**

One (1) solid state time delay relays shall be provided to perform the following functions:

1. Low Suction Timer

The solid state time delay relay shall have an adjustable time range of 10 seconds to 10 minutes. The relays shall be constructed to use a DIN rail mount socket so that the relays can be replaced without disturbing the wiring. The relay shall be complete with LED indicators for output and power.

Hand-Off-Automatic switches shall be oil tight, 3-position maintained and be located on the main control panel door.

1. Pump #1
2. Pump #2
3. Exhaust Fan (2-position) Run-Auto
4. Telemetry Test

Indicating lights shall be oil tight, with a full voltage pilot light and be provided:

1. Red - Low Suction Pressure
2. Green - Pump #1 in Operation
3. Green - Pump #2 in Operation

Nameplates shall be furnished on all panel front mounted switches and lights.

The control panel door shall be complete on the interior with a stick-on transparency containing an "as-built" reproduction of the electrical control panel schematic. The wiring diagram shall be a corrected "as-built" copy and contain individual wire numbers, circuit breaker numbers, switch designations and control function explanations.

2.44 ELECTRICAL APPARATUS – ALARMS

The following alarms/status points shall be included within the booster pump station:

1. Water within station alarm
2. Power fail alarm

The water alarm shall be a 120 volt AC circuit driven by a float switch wall mounted within the equipment capsule. The float switch shall be of the magnetic float type with the float moving up and down a guide tube. One-half (1/2) inch of float movement shall actuate the SPST reed type switch inside the guide tube. The switch shall be so mounted that when water reaches a point one (1) inch above the sump the float switch will activate the alarm. The alarm will be sealed in through an auxiliary relay and will be manually reset via a push button station.

The power fail alarm shall be provided by 120 volt AC relay.

2.45 ELECTRICAL APPARATUS – CONDUIT AND WIRING

The service entrance conduits shall be rigid steel conduit, individually sized to accept the inbound service conductors and telemetry/telephone/radio cables, and shall be installed from the main power or control panel through the equipment capsule side sheet and terminate exterior to the equipment capsule. The service entrance exterior conduit connection points shall be capped or plugged for shipment.

All wiring within the equipment capsule and outside of the control panel or panels shall be run in conduit except for the watertight flexible conduit and fittings used to connect pump drivers, fan motors, solenoid valves, limit switches, etc., where flexible connections are best utilized, in accordance with the National Electrical Code. Only the sump pump and dehumidifier, where furnished by the original manufacturer with a UL approved rubber cord and plug, may be plugged into a receptacle.

EQUIPMENT CAPSULE CONDUIT - Rigid, heavy wall, Schedule 40 PVC with solvent weld moisture-proof connections, in minimum size 3/4" or larger, sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 347 of the National Electrical Code and NEMA TC-2, Federal WC-1094A and UL-651 Underwriters Laboratory Specifications.

FLEXIBLE CONNECTIONS - Where flexible conduit connections are necessary, the conduit used shall be liquid-tight, flexible, totally nonmetallic, corrosion resistant, nonconductive, U.L. listed conduit sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 351 of the National Electrical Code.

MOTOR CIRCUIT CONDUCTORS - Sized for load. All branch circuit conductors supplying a single motor of one (1) horsepower or more shall have an ampacity of not less than 125

percent of the motor full load current rating, dual rated type THHN/THWN, as set forth in Article 310 and 430-B of the National Electrical Code (NEC), Schedule 310-13 for flame retardant, heat resistant thermoplastic, copper conductors in a nylon or equivalent outer covering.

CONTROL AND ACCESSORY WIRING - Sized for load, type MTW/AWM (Machine tool wire/appliance wiring material) as set forth in Article 310 and 670 of the National Electrical Code, Schedule 310-13 and NFPA Standard 79 for flame retardant, moisture, heat and oil resistant thermoplastic, copper conductors in compliance with NTMA and as listed by Underwriters Laboratories (AWM), except where accessories are furnished with a manufacturer supplied UL approved rubber cord and plug.

2.46 ELECTRICAL APPARATUS – RECEPTACLES

Two (2) duplex, ground fault circuit interrupter type receptacles shall be furnished about the periphery of the equipment capsule, with one (1) receptacle adjacent to the main control panel. One (1) additional receptacle, three-wire grounded type, shall be installed and dedicated solely to sump pump/ dehumidifier service only.

2.47 CONVENIENCE GROUP - LIGHTING

There shall be one or more two-tube, 32 watt per tube, electronic start, enclosed and gasketed, forty-eight (48) inch minimum length fluorescent light fixtures installed within the equipment capsule, as shown on the plan for this item. One (1) light fixture shall be located directly over the main control panel. The light switch shall be of the night glow type and be located within the hatch periphery. The light switch shall be wired to operate the exhaust fan equipment whenever the equipment capsule lights are on. Open fluorescent or incandescent fixtures will not be accepted.

2.48 CONVENIENCE GROUP - HEATER

1. One (1) each wall mounted as shown.
2. Rating - 10,240 BTU/HR - 3000 watts, 230 volt.
3. Enclosed resistance wire within steel finned element.
4. Control - thermostat.
5. UL listed.
6. Vane axial fan - floor flow discharge.
7. Hard wired in conduit per UL 400-1.

2.49 CONVENIENCE GROUP – EXHAUST FAN

1. One (1) each installed as shown.
2. Capacity each 232 cfm at .2 inch static pressure.
3. Shaded pole motor - squirrel cage blower.
4. Hard wired in conduit to conduit box on motor per UL 400-1.

5. 120 volt A.C. operation from wall mount thermostat and HAND/AUTO switch on main control panel.
6. Hatch installed limit switch to activate exhaust fan whenever the entrance hatch is open.
7. Exhaust air piping - 3 inch minimum.
8. Air return piping - 3 inch minimum.
9. Exhaust and return piping protected by 180° PVC return bend with removable insect screen.
10. When exhaust fans and an air conditioner or fan coil cooling unit are both used, the exhaust fans' control wiring shall contain relay contacts (normally closed) that open the exhaust fans' circuit whenever an air conditioner or fan coil cooling unit is in operation.

2.50 CONVENIENCE GROUP - SUMP PUMP

1. One (1) each installed as shown.
2. Capacity 19 gpm at 15 feet TDH.
3. Impeller - glass filled valor.
4. Cast iron motor shell, switch cap and pump housing.
5. UL listed submersible oil filled motor - UL listed rubber power cord - 120 volt AC operation.
6. Float operated, submersible (NEMA 6) mechanical switch.
7. Completely submersible, hermetically sealed.
8. Auto reset thermal overload protection.
9. PVC pump discharge piping 1" x 1" with single check valve - union both sides.
10. Provision for dewatering drain system for freeze protection.

2.51 CONVENIENCE GROUP - DEHUMIDIFIER

1. One (1) each installed as shown.
2. Capacity 25 pints per 24 hours (AHAM Standard DH-1).
3. Refrigerant type, with environmentally safe refrigerant.
4. Compressor rated 1/5 HP, 4.1 amps, 400 watts.
5. Condensate piped direct to sump.
6. 120 volt AC operation by dial-controlled adjustable humidistat.
7. UL listed rubber cord.

PART 3 EXECUTION

3.01 INSTALLATION

Installation shall be in accordance with the manufacturer's recommendations.

3.02 FACTORY START-UP SERVICE

1. Start-up service technician shall be a regular employee of booster station manufacturer.
2. As part of the submittal covering this equipment, list the factory service manager, his employee number, his telephone number with extension and his number of years with the company. List also each start-up service technician, his employee number and years of service with the company.
3. Verify that one (1) or more of the service technicians listed above will perform the required start-up service on the equipment covered in the submittal.
4. One (1) full day at job site for start-up and training.
5. Start-up service to include two (2) bound O&M manuals.
6. Start-up service report attested to by start-up technician and representative of owner or engineer.
7. Service report distributed to:
 - A. Manufacturer's File
 - B. Engineer's File
 - C. Contractor's File
 - D. Owner's File

3.03 MANUFACTURER'S WARRANTY

The warranty is the sole responsibility of the station manufacturer and that manufacturer's warranty shall be provided in written form for inclusion with both the submittal covering the specified equipment and the O&M manuals provided with that equipment.

Said manufacturer's warranty shall at a minimum cover:

1. A period of one (1) year commencing upon successful start-up, after authorized manufacturer's start-up.
2. The warranty period shall be inviolate regardless of any component manufacturer's warranty for equipment and components within the station.
3. The manufacturer's warranty shall cover all equipment, components and systems provided in or with the station by the manufacturer of the station, exclusive of those components supplied by and/or installed by others independent of the manufacturer of record for this station.

4. The warranty shall provide for the station manufacturer to bear the full cost of labor and materials for replacement and/or repair of faulty or defective components so there shall be no cost incurred by the Owner for this work during the warranty period.
5. The manufacturer's warranty policy is amended only by the items considered consumables, i.e., light bulbs, pump seals, pump packing, lubricants and other maintenance items consumed by usage.
6. No assumption of contingent liabilities for any component failure during manufacturer's warranty is made.

It is the intent of this manufacturer's warranty to gain for the owner a single source responsible party for all components specified herein. "Second party" or "pass through" warranties will not be accepted.

If the submitted written manufacturer's warranty does not meet the minimum requirements set forth above, that submittal will forthrightly be rejected.

END OF SECTION

APPENDIX A

DOT PERMIT

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

The DOT Permit will be included as part of an Addendum.

APPENDIX B
COUNTY ROAD PERMIT

The County Road Permit will be included as part of an Addendum.

APPENDIX C

**BRACKEN COUNTY WATER DISTRICT
STANDARD SPECIFICATIONS**

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

**STANDARD SPECIFICATIONS
FOR
WATER LINE CONSTRUCTION**

BRACKEN COUNTY WATER DISTRICT

NOVEMBER 3, 1997

PREPARED BY

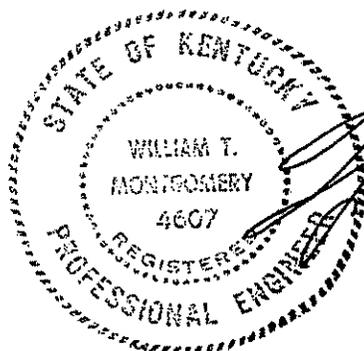
**MAYSVILLE SURVEY & ENGINEERING CO., INC.
107 WEST SECOND STREET
MAYSVILLE, KENTUCKY 41056**

**STANDARD SPECIFICATIONS
FOR
WATER LINE CONSTRUCTION
BRACKEN COUNTY WATER DISTRICT**

I N D E X

TECHNICAL SPECIFICATIONS

DOCUMENT NUMBER		NUMBER OF PAGES
01010	SUMMARY OF WORK	2
01031	STAKING	2
01400U	QUALITY ASSURANCE	5
02100	CLEARING & GENERAL SITE PREPARATION	2
02221	TRENCHING, BACKFILLING & COMPACTION	6
02223	ROADWAY TRENCHING, BACKFILL, COMPACTION & PAVEMENT REPLACEMENT	2
02223S	FLOWABLE FILL	4
02224	PIPE BORING AND JACKING	2
02600A	BITUMINOUS CONCRETE PAVING	3
02611	GRAVEL PAVING	1
02800	SEEDING AND PROTECTION	2
02801	FENCE REPLACEMENT & FINAL CLEANUP	1
03300	CAST-IN-PLACE CONCRETE	11
15060	METAL PIPE AND FITTINGS	3
15064	PLASTIC PIPE AND FITTINGS	4
15080	WATER SERVICE LINES AND TAPS	4
15101	GATE VALVE ASSEMBLIES	2
15121	WATER PRESSURE REGULATOR	1
15126	AIR VALVE ASSEMBLIES	2
15171	SAMPLE STATION	1
15425	BLOWOFF ASSEMBLIES	3
15530	FIRE HYDRANT ASSEMBLIES & FLUSH HYDRANT ASSEMBLIES	3
50000	STANDARD DRAWINGS	13



William T. Montgomery
11/2/57

SECTION 01010

SUMMARY OF WORK

(This Section to be completed with each project)

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Title:
- B. Project Description:
- C. Owner: Bracken County Water District
103 Woodward Ave.
P.O. Box 201
Brooksville, Kentucky 41004
(606) 735-3513
Contact: Eddie Chinn, Distribution Supervisor
- D. Engineer:
- E. Responsibility of Supervision & Construction Observation
- F. The Project will be constructed on
 - 1. on easements to the Bracken County Water District
 - 2. (other)

1.02 WORK NOT COVERED BY CONTRACT DOCUMENTS

- A. (List)
- B.

1.03 CONTRACT DOCUMENTS

- A. The Contract Documents for this project include:
 - 1. Plans prepared by the Engineer - dated:
 - 2. "Standard Specification for Water Line Construction" for the Bracken County Water District - dated November 3, 1997 - approved by the Division of Water (date), including other related specifications referenced therein.
 - 3. Applicable Standard Drawings referenced with the Standard Specifications and Special Details are included and made a part of the plans.

4. Additional (or Modifications) to the Standard Specifications/Standard Drawings specific to this project.

B. Additional or Modified Specifications Specific to this project are listed below and made a part of the Contract Documents.

<u>Document No.</u>	<u>Title</u>	<u>Addition/Modification</u>
---------------------	--------------	------------------------------

PART 2 - PRODUCTS & MATERIALS

2.01 GENERAL

2.02 FURNISHING & PAYMENT

2.03 QUALITY CONTROL/ASSURANCE

PART 3 - DESCRIPTION OF WORK

3.01 GENERAL

A. Staking (Locating work)

B. Quality Control

3.02 INSTALLATION (CONSTRUCTION)

A. Installation and Payment

B. Associated Construction (items) to be part of the project.

3.03 ITEMS OF WORK NOT ANTICIPATED ON THE PROJECT

3.04 ITEMS OF WORK TO BE PERFORMED BY OWNER
(DESCRIBE)

3.05 OTHER AGENCY APPROVALS REQUIRED

DEPT. OF TRANSPORTATION (D.O.T.)
STREAM CROSSING
STORM MANAGEMENT
PSC
OTHER (DESCRIBE)

YES

NO

END OF SECTION

SECTION 01031

STAKING

PART 1 - GENERAL

1.01 DESCRIPTION

A. It is the responsibility of the Contractor (and/or Subcontractor) to provide the necessary field surveying for construction stake-out for this project.

B. SECTION INCLUDES:

1. The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown on the CONTRACT DOCUMENTS.

2. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

3. The field surveying will apply to all items of work performed in accordance with these CONTRACT DOCUMENTS, including information for as-built drawings.

C. RELATED SECTIONS:

1. All work performed under these specifications.

1.02 SUBMITTALS

1. One copy of all field notes required for as-built drawings.

PART 2 - PRODUCTS AND MATERIALS

2.01 GENERAL

A. The Contractor shall furnish all stakes and hubs as required for the project. The stakes shall be strong, sound, straight, free from knots, dressed on 2 sides, and pointed. Hubs shall be strong, sound, undressed oak lumber, and pointed. Stakes shall be a

minimum of 19 mm (3/4 inch) thick when dressed, and hubs shall be a minimum of 50.8 mm (2 inches) square. Stake widths and lengths of both stakes and hubs, shall be that necessary for their intended use.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall furnish all necessary personnel and equipment to provide a construction staking party.
- B. The Contractor's construction staking party shall perform all staking operations necessary to complete the project except those listed above which will be performed by the Owner.
- C. The Contractor's staking party shall be under the general supervision of a Registered Professional Surveyor. It shall be definitely understood that the supervision of the construction staking party is solely the responsibility of the Contractor and any errors or inaccuracies resulting from the operations of the construction staking party shall be corrected at no cost to the Owner.
- D. The Contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

END OF SECTION

SECTION 01400U
QUALITY ASSURANCE

PART 1 - GENERAL

1.01 DESCRIPTION

A. It is the responsibility of the Owner through their Engineer and/or specified representative to control the quality of work and materials on this project. Requirements of this section apply to the assurance to be provided to the owner of the quality of the work and materials.

B. SECTION INCLUDES

1. Field and laboratory testing of materials and products, observation of methods, and reporting the tests and observation results to the Owner for the following items of work:

- (a) Utility Excavation and Backfill
- (b) Granular Base and Asphalt Concrete Paving
- (c) Concrete and Reinforced Concrete

C. RELATED SECTIONS

1. All work performed under these specifications.

1.02 SUBMITTALS

1. One copy of all field and laboratory test results will be submitted to the Contractor, Engineer and Owner.

2. One copy of all daily observation reports will be submitted to the Contractor, Engineer and Owner.

3. One copy of certifications and recommendations will be submitted to the Contractor, Engineer and Owner.

PART 2 - PRODUCTS AND MATERIALS

2.01 GENERAL

A. All products and materials shall be in accordance with the requirements of these specifications or approved by the Engineer, and/or Owner in writing.

PART 3 - EXECUTION

3.01 GENERAL

A. The Owners representative on construction and/or Engineer shall determine the extent of field and laboratory testing required.

B. The Contractor will secure and pay for the services of a qualified testing firm, providing services within the state which the work is being performed, and approved by the Owner. All of the work will be observed and tested by qualified technicians under the direction of a Registered Professional Engineer.

C. Certification and recommendation will be required of the testing firm, to the Owner for approval of the various items of work.

3.02 UTILITY EXECUTION AND BACKFILL

A. Testing firm selected shall be retained to perform construction testing on-site as follows:

1. Perform at least one compaction test at intervals not exceeding 100 feet of trench of each lift or layer of backfill placed under buildings or paved areas.

B. If compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to Owner.

C. The following tests shall be performed on each type of material used as compacted fill as part of construction testing requirements:

1. Moisture and Density Relationship: ASTM D698
2. Mechanical Analysis: AASHTO T-88

D. Field density tests for in-place materials shall be performed according to following standards as part of construction testing requirements.

1. Sand-cone Method: ASTM D 1556
2. Nuclear Method: ASTM D 2922

E. Certification and recommendation will be required of the testing firm for the following items of work:

1. The trench has been prepared in accordance with specifications and is recommended for backfill placement to begin.

2. All backfill has been placed in accordance with specifications.

3. All pavement and building subgrades have been prepared in accordance with specifications and is recommended for approval for base, paving and building construction to begin.

F. Testing firm shall prepare test reports that indicate test location, elevation data, and test results, and submit copies as per paragraph 1.02 within 48 hours of the time the test was performed.

G. In the event that any test performed fails to meet these specifications, Owner and Contractor shall be notified immediately by the testing firm.

3.03 GRANULAR BASE & ASPHALT CONCRETE PAVING

A. Testing as required on Department of Transportation Right of Way for base and paving construction is the Contractors responsibility.

3.04 CONCRETE AND REINFORCED CONCRETE

A. Testing firm selected shall be retained to perform construction testing for cast-in-place concrete in accordance with these specifications as follows:

1. Provide on-site observation during entire concrete pour for compliance with these specifications.

2. Confirm that all reinforcing steel, construction and expansion joints and embedded items have been installed in accordance with the specifications and is recommended for concrete placement.

3. Once test data has been procured from a particular test, the resulting reports will be distributed as specified in paragraph 1.02. In the event questionable construction methods are observed or a test fails to meet the specified requirements, the testing firm shall immediately contact the Engineer and Contractor.

4. All reports shall be made on white paper, 8 1/2 X 11 inches, suitable for photocopying and bound in booklet form. If larger drawings are absolutely necessary, they shall be folded and bound into the booklet. Written reports and analyses shall be on the testing firm's letterhead. Each drawing shall carry a title block which contains the project name and location, the responsible Engineer's name and address, the data of the investigation, and the date of the drawing.

B. Testing shall include unconfined compression tests of molded concrete cylinders, slump tests, air content tests (where air-entrainment is required) and fresh concrete temperature tests.

1. Concrete shall be sampled, cured and tested for compressive strength in accordance with ASTM C31, C39 and C172. Compressive tests shall be prepared in sets of three cylinders for each test. Specimens for each set shall be obtained at regularly spaced intervals during discharge of the middle half of a load from a stationary mixer or truck. A minimum of one set shall be taken for each 1000 square feet of surface for slabs or walls nor less than one set shall be taken per 50 cubic yards of concrete nor less than one set shall be taken for each foundation of structure except when placing a number of items each smaller than 10 cubic yards, in this case one set per 10 cubic yards shall suffice.

2. All cylinders must be immediately stored adjacent to pour under similar atmospheric conditions, under wet sand, burlap, visqueen or curing compound for approximately 24 hours after preparation. Avoid any impact during this critical time period.

3. After initial storage, the cylinders (still in their molds) shall be paced in sealed polyethylene bags, wet sand or other resilient materials and delivered to the testing laboratory.

4. The testing laboratory shall moist-cure the cylinders until they are tested.

C. TEST FOR SLUMP, AIR CONTENT AND TEMPERATURE

1. Slump tests shall be taken for each set of test cylinders as well as from each load from a stationary mixer or truck to test consistency of concrete. Tests shall be in accordance with ASTM C143 and ASTM C172.

2. The acceptance test for the air content of air-entrained concrete shall be made regularly in accordance with ASTM C173.

3. The temperature of the fresh concrete from each set of cylinders shall be recorded.

D. TEST CYLINDER IDENTIFICATION

Test cylinder sets shall be dated and numbered consecutively. Each cylinder of each set shall be given an identifying letter (A, B, C). In areas such as floor slabs and foundations a sketch shall be prepared to identify pour locations. The following data shall

be recorded on the cylinder mold at the time the cylinders are prepared and shall be included in the test report:

1. Test cylinder number and letter;
2. All foundations or structures covered by this test;
3. Proportions of concrete mix or mix identification;
4. Maximum size coarse aggregate;
5. Specified compressive strength;
6. Slump, air content (where applicable) and fresh concrete temperature;
7. Date poured and time poured;
8. Ambient temperature at time of pour;
9. Name of inspector making cylinders;
10. Whether cylinder failed in shear or classic conical break;

E. TEST CYLINDER RESULTS

Specimens shall be tested in accordance with Standard Method of Test for Compressive Strength of Molded Concrete Cylinders (ASTM C39).

1. Each set of cylinders shall be tested as follows:
 - (a) Cylinder A at 7 days. The result should be at least 60% of the compressive strength.
 - (b) Cylinder B and C at 28 days. Should cylinder A and B obtain the minimum compressive strength, cylinder C shall not be tested, but shall be kept as "insurance" for possible testing at a later date (not to exceed 60 days).
 - (c) The average of the B and C cylinder strengths shall be defined as the strength test result for this set.
2. If the average strength of the laboratory control cylinders for any portion of the structure falls below the compressive strengths required by the specification. The testing firm shall immediately contact the Engineer and Contractor so the appropriate decisions can be made with regard to the construction of the project.

END OF SECTION

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 02100

CLEARING AND GENERAL SITE PREPARATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to all pipe trenchwork, structure and building locations and generally any location of the construction on any portion of the project.

B. Related Work Specified Elsewhere:

1. All work performed under these specifications.

PART 2 - EXECUTION

2.01 ITEMS TO BE CLEARED

A. All trees, brush, stumps, logs, tree roots, fence pipe, and other structures and materials situated at locations scheduled for excavation, fill work or erection of structures shall be removed.

B. The Contractor shall remove additional materials and structures as designated on the Drawings.

C. Improvements such as fencing, earthworks or structures at the periphery of trenchwork or other construction limits shall be preserved in an undamaged state to the maximum extent feasible. Additional structures and materials shall be preserved as designated on the Drawings.

D. Trees outside the immediate limits of construction, and particularly trees alongside trench lines on right-of-way easements, shall be preserved as is practical and feasible.

E. Any trees, shrubs, bushes or structural improvements as may be designated by the Owner's representative shall remain standing.

2.02 DISPOSAL

A. Trees, brush and other removed debris along trenches for utility construction may be deposited along the trench within a permanent owned right of way or easement, only with approval of the property owner. Otherwise, dispose of as in 2.02 (C).

B. The Owner of removed structural improvements shall be given opportunity to store or reuse any such removed items, including fencing and utility pipes, poles, etc.

C. All other removed materials shall be disposed of off the site or as designated by the Owner.

D. Any burning of materials shall be done in accordance with state and local laws.

E. Under no circumstances shall removed materials be buried beneath proposed earthwork or structural improvements; nor shall removed materials be buried close enough to improvements to affect stability.

2.03 STRIPPING

A. All topsoil, loose, organic debris and other materials unsuited as compacted fill or subgrade shall be properly stripped in the area of earthwork operations and erection of structures.

B. The topsoil shall be removed to its full depth and stockpiled for use in finish grading.

C. Any rubbish, objectionable soils and other deleterious materials shall be disposed of off the site, unless the Owner or his designated representative provides for and specifically directs on-site disposal. In no case shall such objectionable material be allowed in or under any fill unless specifically authorized in writing.

END OF SECTION

SECTION 02221

TRENCHING, BACKFILLING AND COMPACTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to all pipe trenchwork, laying, bedding, bracing, backfilling and compaction.

B. Related Work Specified Elsewhere:

1. Pipe Boring and Jacking: Section 02224
2. Metal Pipe and Fittings: Section 15060
3. Plastic Pipe and Fittings: Section 15064
4. Roadway Trenching, Backfill, Compaction and Pavement Replacement: Section 02223

C. The general location of pavements, fences and other improvements have been indicated on the drawings. However, the Contractor is encouraged to make his own investigation of surface and subsurface conditions to be encountered in the work. Improvements not shown on the drawings which are encountered during construction shall be immediately reported to the Engineer. NOTE: State Requirements for water and sewer line separation is as follows:

1. Water lines must be located at a minimum lateral distance of 10 feet from any existing or future sewer lines and sanitary sewer manholes measured from outside diameters. Where a water line must be placed in the same trench as a sewer line, the water line must be located on a shelf, 2 feet above and 2 feet to the side of the sewer line.

2. Water lines crossing under sewer lines, or crossing less than 2 feet above sewer lines, must be encased for a distance of not less than 5 feet on either side of the point of cross over.

1.02 QUALITY ASSURANCE

A. Quality Assurance will be provided in accordance with Section 01400U.

PART 2 - EXECUTION

2.01 TRENCHING

A. Trenches shall be excavated for underground pipe at the locations shown on the drawings or as directed.

B. Unless otherwise indicated on the drawings, minimum depth of cover shall be 30 inches. No extra depth excavation is anticipated and if required by the Engineer, extra depth excavation shall be conducted at no additional expense to the Owner.

C. Excavation except as required for exploration shall not begin until the proposed work has been staked out. This requirement, however, may be waived for short pipelines less than 500 feet in length.

D. Material not required for backfill and site grading shall be removed and disposed of as directed by the Engineer/Owner.

E. Trenches shall be of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe.

F. Unless specifically authorized by the Engineer, trenches shall in no case be excavated or permitted to become wider than two foot plus the diameter of the pipe at the level of or below the top of the pipe.

G. Trench sides less than five feet in height shall be vertical and not laid back to the angle of repose due to the lack of space. Trench bottom shall be smooth and uniform.

H. Before laying the pipe, the trench shall be opened far enough ahead to reveal obstructions that may necessitate changing the line or grade of the pipeline.

I. Under no circumstances shall the Contractor allow excavated materials to accumulate on streets, private property or other access ways.

J. The Contractor shall clear and grub as required to construct the work.

K. Where granular backfill is used in place of earth, the excavated earth shall be disposed of by the Contractor at the direction of the Engineer.

2.02 BLASTING

A. Where rock is encountered that cannot be removed by backhoe, bulldozer or other digging equipment without excessive ramming, blasting shall be conducted.

B. All blasting shall be conducted in accordance with municipal ordinances, state and federal laws, and "Section 1 - Explosives" of Manual of Accident Prevention in Construction published by the Associated General Contractors of America, Inc. All explosives shall be stored in conformity with said ordinances, laws and safety regulations.

C. No blasting shall be done within five (5) feet of any water mains, sewer lines, natural or manufactured gas lines, or explosives. Any damage done by blasting is the responsibility of the Contractor and shall be promptly and satisfactorily repaired by him. No blasting at all will be permitted within 300 feet of any dwelling, barn or other building without the use of adequate steel mesh blasting mats. No blasting shall be conducted within 30 feet of any rail line.

D. The Contractor shall use delay caps or other approved method to reduce earth vibrations and noise. Mud capping, as defined in the above Manual of Accident Prevention, shall not be permitted as a method of breaking boulders.

2.03 TRENCH PROTECTION

A. Adequate and proper shoring of excavation shall be the entire responsibility of the Contractor for whatever reason the need may arise. Trenches over five feet deep shall be shored or laid back at angle of repose.

B. Sheeting, shoring and bracing shall not be removed until sufficient backfill has been placed to protect the construction and/or to prevent damage to adjacent surfaces or structures, and will be renewed and maintained as long as is necessary to complete the work.

C. The Contractor, at his own expense, shall provide adequate facilities for prompt and continuous removal of water from all excavations. He shall use adequate preventive measures to exclude surface drainage from excavations and shall maintain dry conditions within the excavations until the backfill is placed. No additional compensation will be paid for replacement and/or stabilization of prepared excavations due to flooding and/or deterioration from extended exposure.

2.04 PIPE BEDDING

A. In areas that require bedding, the pipe shall be bedded with granular material free of stones, clods or other sharp-edged objects. The bedding shall be such as to receive the pipe so that the pipe weight is uniformly distributed along its length. See Standard Drawing WL 100.

B. In solid rock trenches, a minimum of six inches of granular material shall be used as bedding above and below pipe as shown in Drawing WL 100.

C. The granular material for bedding shall be sand (bank run or washed) or No. 11 stone.

2.05 PIPE LAYING

- A. Pipe shall be placed in the trench clean and undamaged.
- B. For mechanically joined pipe three inches or more in diameter, each piece of pipe shall be lowered separately into the trench.
- C. All pipe shall be laid in the trench so that it is uniformly supported on the bedding material throughout its length.
- D. Care shall be taken to prevent injury to the pipe lining and coating, if any. Any damaged pipe or fitting shall be removed from the trench.
- E. The Contractor shall maintain a supply of 22 1/2 degree and 11 1/4 degree bends on hand to make necessary horizontal and vertical adjustments.
- F. All angles or bends in the piping, either vertical or horizontal, shall be satisfactorily braced or anchored against the tendency of movement with joint harness, concrete, or approved equivalent anchors to the satisfaction of the Engineer. See Drawing WL 101. Where concrete is used, care shall be taken to place it in contact with only the fitting or valve which is being braced or anchored, and to prevent the concrete from covering flanges, bolts and adjacent pipe. Concrete for bracing shall be Class "B" concrete in accordance with Section 03300 of these Specifications.
- G. Only men competent at laying pipe shall be employed on this phase of the work, and complete suitable equipment necessary for the execution of same is required. Any incompetency observed by the Engineer must be remedied at his request, and where improper equipment or lack of same appears to be impairing the quality or speed of the work, such adjustments in same shall be made to the Engineer's satisfaction.
- H. The pipe, fittings and valves shall be placed in the trench with care. Under no circumstances shall pipe or other materials be dropped or dumped into the trench.
- I. Breaks in pipe or joints shall be repaired to the satisfaction of the Engineer and at the expense of the Contractor.
- J. The subgrade upon which the pipe bedding is placed shall consist of material suitable for supporting the pipe without excessive settlement or stress development.
- K. Pipe crossings under field tile shall be in accordance with Standard Drawing WL 102.

2.06 BACKFILL

- A. Backfilling shall be carefully placed to avoid dropping rocks or large clods on the pipe. All backfilling within six inches of the pipe shall contain no stones. Hand-shoveled placement of the initial backfill may be required by the Engineer in rocky soils.
- B. Granular backfill may be required in the absence of clean earth available. See Standard Drawing WL 100.
- C. Excavated rock larger than one foot in any dimension may not be used as backfill unless hand placed or used in upper eighteen inches of trench backfill.
- D. Where blasting has been conducted, granular backfill shall be placed to six inches above the pipe as noted in Drawing WL 100.
- E. The filling of the trench and the tamping of the backfill, where required on the Drawings, shall be carried on simultaneously on both sides of pipe in such a manner that the completed pipe lines will not be disturbed and injurious side pressures do not occur; and pipe coatings, if any, are not damaged.
- F. The compaction requirement for the mechanically tamped backfill is 95% of maximum dry density as determined by ASTM-D-1557, Method D, placed in a minimum of six inch lifts.

2.07 ENCASEMENT

- A. Casing Pipe - Open Cut
 - 1. At locations indicated on the drawings or directed on construction, casing pipe shall be installed in an open-cut trench. The casing pipe shall be installed as required in these specifications for all pipe trenchwork, laying, bedding, bracing, backfilling and compaction.
 - 2. Plastic casing pipe shall be as noted on the drawings. Steel casing pipe shall conform to the requirements of Section 02224.
 - 3. For installations using steel casing pipe and PVC carrier pipe, prefabricated spacers, or other permanent spacing devices on ten foot centers shall be installed to insure non-contact between the steel and PVC pipe.
 - 4. State road crossings and stream crossings shall be in accordance with plan drawings.
- B. Concrete
 - 1. Pipe shall be encased in concrete where shown on the drawings or as directed by the Engineer, in accordance with drawing WL 100.

2. Encasement concrete shall be Class "B" in accordance with Section 03300 of these Specifications.

3. The entire width of the excavated trench to the depth specified shall be filled with encasement concrete.

C. Boring and Jacking

1. Boring and jacking shall be in accordance with Section 02224.

END OF SECTION

SECTION 02223

ROADWAY TRENCHING, BACKFILL, COMPACTION AND PAVEMENT REPLACEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to trenchwork in city, county, and state roadways, sidewalks and shoulders, as well as private paved drives.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Pipe Boring and Jacking: Section 02224
3. Bituminous Concrete Paving: Section 02600

1.02 QUALITY ASSURANCE

A. Quality Assurance shall be in accordance with Section 01400.

PART 2 - EXECUTION

2.01 GENERAL

A. All requirements of Section 02221 shall govern general trench and backfill work in roadways, except as modified herein.

B. Unless otherwise directed by the Engineer, the Contractor shall replace all streets, alleys, drives, walks and roadways which may be removed, disturbed, or damaged in connection with his work. He shall reconstruct same to the original lines and grades and in such a manner as to leave all such surfaces in fully as good or better conditions than that which existed prior to his operations.

C. Bituminous pavement replacement shall conform to Section 02600. Concrete paving shall conform to Section 03300.

2.02 REPLACING NON-STATE MAINTAINED PAVED SURFACES

A. All work shall be in accordance with details as shown on Standard Drawing WL 103.

B. With approval of the Engineer, granular backfill may be substituted for tamped earth backfill up to within six inches plus pavement depth of the surface.

C. All granular backfill shall be compacted to 83% of solid volume density in lifts not to exceed six inches.

D. Pavement depths and widths shall match existing pavements, except that bituminous pavement depth need not exceed four inches in any case, placed in two equal lifts.

2.03 REPLACING STATE-MAINTAINED PAVED SURFACES

A. All work shall be in accordance with details as shown on the drawings and Standard Drawing No. WL 103. Flowable Backfill, as required, shall be in accordance with Section 02223S.

B. Materials and methods shall conform to applicable provisions of the Kentucky Standard Specifications for Road and Bridge Construction, latest edition in force at the date of the contract.

2.04 MAINTENANCE

A. The base course and temporary surfacing shall be maintained by the Contractor at his entire expense until the final surfaces are constructed as required.

B. At least one lane of traffic shall be kept open at all times.

C. All trenches shall be properly covered by metal sheeting overnight.

D. Both local and through traffic along State maintained routes shall be maintained in accordance with the KY Department of Highway Specifications, Section 104.04. Local thoroughfares and thruways shall be maintained in such manner that local residents shall have access to their property from at least one direction.

2.05 ROADWAY SHOULDERS

A. All trenches centered within four feet of pavement edge shall be backfilled with tamped local backfill in six inch lifts, or compacted granular backfill (DGA or No. 9).

B. All disturbed ditches shall be restored to original flow lines or improved, as necessary, to flow towards culverts or streams without obstruction or ponding.

END OF SECTION

SECTION 02223S
SPECIAL SPECIFICATION
FLOWABLE FILL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The requirements of this Section apply to flowable fill used as backfill of open-cut trenches under state-maintained surfaces.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Roadway, Trenching, Backfill, Compaction & Pavement Replacement: Section 02223

1.02 QUALITY ASSURANCE

A. Quality assurance shall be in accordance with Section 01400U.

PART 2 - MATERIALS

2.01 D.O.T. REFERENCE

A. Section references herein are to the Department's 1994 Standard Specifications for Road and Bridge Construction.

2.02 DESCRIPTION

A. When desired, and no specific method of backfill is specified, furnish and place flowable fill as backfill material for all types of pipe. Flowable fill is a low strength mixture that consists of portland cement, sand, class F fly ash, water and other materials as approved by the Engineer. Flowable fill has a density between 1842 kg/m^3 (115 lb/ft^3) and 2082 kg/m^3 (130 lb/ft^3) and has a consistency that allows it to flow under and around pipe. Flowable fill does not require compaction, finishing, or curing and does not settle after hardening. Use in restricted areas where placing and compacting fill material is difficult and where long traffic delays are not desirable. When backfilling aluminum pipe, provide an approved means of separation such as bituminous coating.

2.03 MATERIALS

A. Mixture Requirements and Proportions conform to the following sections:

Portland Cement, Type I	801
Sand	804.03
Fly Ash, Class F	844 (Contrary to subsection 844.01, the loss on ignition will not exceed 12%)
Water	803

Unless otherwise approved by the Department, proportion flowable fill as follows, per cubic meter (cubic yard):

Cement	14 kg (30 lbs.)
Fly Ash, Class F	136 kg (300 lbs.)
Sand (S.S.D.)	1360 kg (3,000 lbs.)
Water (Maximum)	250 kg (550 lbs.)

B. Alternate Mixtures: The Department may approve other mixtures. The mixtures may include other proportions of the above materials, Class C fly ash, chemical admixtures, or aggregate not conforming to the requirements of the Standard Specifications. When deviating from the above specified proportions and materials, make and test a trial batch of at least 3.6 cubic meters (4 cubic yards) to insure that the mix will have flow and density characteristics suited for the intended use. Use the ingredients, proportions, and equipment intended for the project including batching, mixing, and delivery. Require mixtures to be firm within 3 hours. General guidelines are as follows:

1. Require a minimum flow of 200 mm (8 inches) when tested with a 75-mm X 300-mm (3 inch X 6 inch) open ended cylinder modified flow test.
2. Mixture bleeds freely within 10 minutes.
3. Require the mixture to support a 68 kg (150 lbs.) person within 3 hours.

The Department will observe all phases of the trial batching for approval. Submit the proposed mixture proportions and test results for the minimum flow, time of bleeding, and time to achieve firmness to the Engineer for review and approval. When the mixture is proprietary, comply with Section 107.05.

C. Testing: The Department will cast test cylinders for each 229 cubic meters (300 cubic yards) of flowable fill placed. Do not rod the cylinders, but lightly tap the sides of the mold. Allow the test cylinders to bleed for about 30 minutes, refill, and then cover with a sheet of tough durable impervious plastic or cylinder lid. Secure the plastic in place around the mold, within one inch of the top, with a rubber band or string then cover the lid with wet burlap. Remove the burlap after 24 hours and cure at 15.6°C

(60°F) to 32.2°C (90°F), in the shade, for 28 days. Require an average compressive strength of 345 kPa (50 psi) to 690 kPa (100 psi) at 28 days. This strength range provides the optimum balance of cohesion and ease of subsequent removal when necessary.

PART 3 - EXECUTION

3.01 PIPE BEDDING & BACKFILL

A. Pipe Bedding: All carrier pipe may be bedded with granular material to a maximum of 6 inches over the pipe. All bedding material shall be thoroughly compacted.

B. Trench Backfill: All backfill within existing and proposed pavement areas from six inches over the pipe to existing subgrade shall be Flowable Fill meeting the requirements of the attached specifications. No granular backfill is allowed.

3.02 CONSTRUCTION

A. Deliver: Unless otherwise approved by the Department, deliver the flowable fill in revolving drum truck mixers conforming to Section 601 and ensure the mixture is in suspension when placed. Agitate during transportation and waiting time to prevent subsidence.

B. Placement: Require a minimum trench width of 152 mm (6 inches) clearance on each side of the pipe. Standing water in the trench is acceptable when backfilling with flowable fill. Deep trenches may require bleeder trenches or placement in layers to drain excess water.

Because certain types of pipe may float, backfill in lifts or anchor the pipe when necessary. Backfilling in lifts is more applicable to long lines of pipe, allowing time for a substantial amount of the water to dissipate before applying the next lift. Anchors may be made of small lumber or metal straps, and adequately spaced. For larger diameter pipe, it may be possible to maintain a surge of flowable fill on top of the pipe to prevent floating. Floating will usually not occur after the level of the backfill is above the springline of the pipe. Ensure that the pipe remains in the correct horizontal position and elevation.

Place flowable fill by discharging directly from truck chutes into the trench or place by means of conveyors, buckets or pumps. When pumping, fill the voids adequately with solid particles to provide cohesion during the transport through the pump line under pressure to prevent segregation and line blockage. Maintain continuous flow through the pump line to prevent segregation and line blockage.

Place the flowable fill from the top of the compacted bedding to the bottom of the pavement structure. Unless otherwise directed by the Engineer, require a minimum of 2 hours before the addition and compaction of any material above the flowable fill.

To expedite settling and hardening in cool weather, drain or pump the bleed water from the surface or overflow the trench to allow bleed water to flow out. When overflowing, remove all excess material after hardening.

C. Mixture Adjustments: To expedite settlement and hardening, the flowable fill will bleed water within 5 to 10 minutes after placement. The release of water by bleeding causes the solid particles to realign and become firm. Delay in bleeding indicates there are too many fines in the mixture or insufficient water. If the maximum water was added, reduce the fly ash quantity in increments of 23 kg (50 lbs.) until the mixture bleeds freely. Add approximately 27 kg (60 lbs.) of sand to replace each 23 kg (50 lbs.) increment of fly ash to maintain the original yield. When two increment reductions, 46 kg (100 lbs.), do not promote free bleeding of the mixture, evaluate other possible remedies. The flowable fill is too dry when cracks develop as it flows into place.

END OF SECTION

SECTION 02224

PIPE BORING AND JACKING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Pipe shall be bored or jacked (pushed) where shown on the drawings.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221

PART 2 - PRODUCTS

2.01 STEEL CASING PIPE

A. Casing pipe shall be steel, plain end, shall conform to AWWA C 202, and shall have a minimum wall thickness of 3/8 inch throughout, unless otherwise specified on the drawings.

B. Casing pipe to be bored and jacked shall neither be coated or wrapped.

C. Pipe shall be furnished in 18 foot minimum lengths, except for special lengths ordered to complete a full length of casing pipe as may be approved by the Engineer.

D. Steel for casing pipe shall have minimum yield strength of 35,000 psi.

E. Steel casing pipe shall be sized as follows unless otherwise approved by the Engineer.

Carrier Pipe	Casing Pipe
1"	2"
2"	4"
4"	8"
6"	10"
8"	14"
10"	16"
12"	18"

2.02 JOINTS

A. If required, joints welded in the field shall be made by a duly certified welder. Joints shall be solidly welded in accordance with AWWA C 202.

PART 3 - EXECUTION

3.01 BORE OR JACK

A. Where designated on the drawings or when directed by the Engineer, crossing beneath roads or other surfaces are to be installed by boring or jacking, so as the existing surface shall not be disturbed. In such instances, the Contractor shall provide a jacking pit, bore thorough the earth, and/or rock, jack the cover pipe into proper position and grade and then install the pipe within the cover pipe by pushing.

3.02 CLOSURE

A. Where the carrier pipe enters the casing pipe underground, the gap between the casing pipe I.D. and carrier pipe O.D. shall be closed against foreign materials but not tightly sealed.

3.03 PUSHING

A. Where designated on the plans or when directed by the Engineer, two inch or smaller crossings beneath roads or other surfaces shall be pushed (or jacked) so as not to disturb the existing surface. The Contractor at his discretion, may or may not use a casing pipe. The method of pushing and the finished push shall meet the approval of the Engineer on construction. For "pushed" crossings no direct payment will be allowed for any casing pipe used or the pushing operations and such work shall be incidental to the work performed under the bid items for the carrier pipe of the class and size constructed.

3.04 ROAD CROSSINGS

A. Bored or pushed crossings beneath roadways shall be a minimum of 30 inches below the roadway ditch. The bore or push shall begin (or end) at a minimum distance of 1.5 times the depth of pipe from the edge of pavement.

END OF SECTION

SECTION 02600A

BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section shall apply to all asphaltic paving including resurfacing of existing asphalt surfaces.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221

1.02 QUALITY ASSURANCE

A. All work shall be in conformance with the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction", latest edition, hereinafter referred to as the "KYDOT Specifications".

PART 2 - PRODUCTS

2.01 DENSE GRADED AGGREGATE

A. Dense graded aggregate shall consist of crushed stone or crushed slag in combination with approved mineral filler as needed to meet grading requirements. The aggregate shall have a sand equivalent value of no less than 25.

The aggregate shall meet the following general requirements.

Wear (except slag)	40% (maximum)
Wear (slag only)	50% (maximum)
Soundness (5 cycles)	12% loss (maximum)
Friable particles	1.0% (maximum)
Shale	2.0% (maximum)
Unit Weight (slag)	70 pcf (maximum)

B. Grading requirements for dense graded aggregate are as follows:

Nominal Size	Amount Finer than Each Lab Sieve (% by wgt).
Size Sq. Openings	1 3/4 3/8 #4 #10 #40 #200
DGA 3/4 to 1	100 70-100 50-80 35-65 25-50 12-30 5-12

2.02 PRIME COAT AND TACK COAT

A. Prime coat shall meet requirements of Section 407 of the KYDOT Specifications.

B. Tack coat shall meet requirements of Section 407 of the KYDOT Specifications.

2.03 BITUMINOUS CONCRETE MATERIALS

A. Bituminous concrete for all courses shall be composed of asphalt, crushed limestone or porous aggregate, and mineral filler, as necessary, if porous aggregates are used.

B. Bituminous paving materials may be either plant mix or road mix in accordance with Sections 401 through 406 of the KYDOT Specifications.

C. Binder courses are not anticipated, but if required, shall be as listed in the latest edition of Kentucky Department of Transportation Specifications.

PART 3 - EXECUTION

3.01 AGGREGATE BASE INSTALLATION

A. After the backfill or excavation has been compacted to the correct grade, the Contractor shall then place six inches of compacted dense graded aggregate as a base course.

B. The aggregate shall be placed in one six-inch layer or two three-inch layers and thoroughly compacted to not less than 83% of solid volume.

C. Any depressions shall be filled with aggregate and the process of compacting continued until the subgrade has a smooth and uniform surface.

D. The base course shall be maintained by the Contractor at his entire expense until the final surfaces are constructed as specified.

3.02 PRIME COAT

A. The aggregate base shall be thoroughly cleaned and broomed and a prime coat of medium tar shall be uniformly applied at a rate of 0.30 gallons per square yard.

B. The prime coat shall be applied by a pressure distributor or approved pressure spray method in accordance with 407 of the KYDOT Specifications.

3.03 TACK COAT

A. A tack coat shall be applied to the base course of bituminous concrete in accordance with Section 407 of the KYDOT Specifications.

3.04 BITUMINOUS CONCRETE COURSES

A. New bituminous concrete paving shall be applied in two minimum 1/2 inch courses with tack coat between courses.

B. Paving shall be mixed and placed in accordance with requirements for plant mixed or road mixed bituminous paving depending on type selected by Contractor. Applicable requirements are listed in Section 401 through 406 of the KYDOT Specifications.

3.05 PAVEMENT REPLACEMENT

A. All existing bituminous pavements disturbed by trench work shall be restored to their original conditions with dense graded aggregate and bituminous courses equaling the dimensions of existing courses unless otherwise specified.

Construction methods shall conform to requirements given above. See Standard Detail WL 103.

3.06 SEASONAL AND WEATHER LIMITATIONS

A. In the event the progress and scheduling of the work is such that the bituminous pavement replacement would occur in the winter months, during adverse cold weather and/or during such times the asphalt plants are not in operation, then the final pavement replacement shall be postponed until favorable weather occurs in the spring and the asphalt plants resume normal operations. No bituminous concrete shall be laid between November 15 and April 1, nor when the temperature is below 40 degrees F., except by written permission of the Engineer. The Contractor will be required to maintain temporary surfacing approved by the Engineer until the permanent pavement is placed. Such labor, materials and equipment as is required for temporary maintenance of the streets, roadways, and driveways shall be provided at the Contractor's expense and is not a pay item.

END OF SECTION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 02611

GRAVEL PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Roadway Trenching, Backfill and Compaction: Section 02223

1.02 QUALITY ASSURANCE

A. All references to stones by name or number shall represent stone classifications of the Kentucky Department of Transportation. Not only gradation requirements but soundness, percent crushed face and all other related DOT requirements must be met by the stone in question.

1.03 TIMING OF REPLACEMENT

A. Gravel drives shall be backfilled and restored within 12 hours of disturbance and shall not be left open overnight. Backfilling and compaction shall be as specified in Section 02223 of these specifications for Non-State maintained paved surfaces.

PART 2 - PRODUCTS

2.01 GRAVEL ACCESS DRIVES AND ALL PRIVATE/PUBLIC ROADS

A. All existing private and public gravel surfaces shall be replaced to the existing depths, compacted in place, with No. 610 stone, or equal.

END OF SECTION

c. Should individual tests of laboratory-cured specimens produce strengths more than 500 psi below f'c or tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that load-carrying capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate that the load-carrying capacity may have been significantly reduced, tests of cores drilled from the area in question may be required in accordance with "Standard of Concrete" (ASTM C-42). Three cores shall be taken for each case of a cylinder test more than 500 psi below f'c. The cores shall be immersed in water for at least 48 hours and tested wet. Payment for drilled cores and additional testing shall be the responsibility of the Contractor.

Concrete represented by the core tests will be considered structurally adequate if the average of the three cores is equal to at least 85 percent of f'c and if no single core is less than 75 percent of f'c.

2. Other tests will be conducted at the direction of the Engineer.

D. Actual non-compliance and/or ominous trends shall be determined by the Engineer or his appointed representative and such information shall be relayed expeditiously to the concrete supplier and confirm promptly in writing.

Testing results of concrete furnished subsequent to such notification shall comply or a second warning will be issued. Non-compliance after two warnings will be sufficient cause to refuse additional concrete from the non-complying producer.

E. Certifications

1. The Contractor and concrete producer shall submit a certificate from an approved laboratory attesting that the admixture exceeds the physical requirements of ASTM C-494, Type A, water reducing and normal setting admixture and when required, for ASTM C-494, Type D, water reducing and retarding admixture.

2. The ready-mixed concrete production facility shall hold a current certification from the National Ready Mixed Concrete Association.

PART 2 - PRODUCTS

2.01 CEMENT

A. Cement shall conform to ASTM C-150, Type I or II. Only one brand and manufacturer of approved cement shall be used for exposed concrete.

2.02 AIR-ENTRAINING AGENT

A. A neutralized vinsol resin air-entraining admixture meeting the requirements of ASTM C-26 shall be used in all concrete specified as air-entrained. The quantity used shall be varied to produce the specified amount of total air content.

2.03 WATER-REDUCING SET-CONTROLLING ADMIXTURE

A. "Pozzolith" series 100 or 200 manufactured by Master Builders Company or W.R.D.A. - Hycol or Daratard 17 manufactured by W.R. Grace & Company or an approved equal shall be used in all concrete.

2.04 WATER

A. Water shall be drinkable, clean, free from injurious amounts of oils, acids, alkalies, organic materials or deleterious substances.

2.05 FINE AND COARSE AGGREGATES

A. Fine and coarse aggregates shall conform to concrete ASTM specification C-33, "Specification for Concrete Aggregates". Maximum size of coarse aggregates shall be not larger than three-fourths the minimum clear spacing between reinforcing bars, and not larger than one-fourth the thickness of slabs. Local aggregates which have shown by tests and by actual service to produce satisfactory qualities may be used when approved by the Engineer.

2.06 SURFACE HARDENER

A. Materplate Pre-Mixed manufactured by Master Builders Company or approved equal. It shall be packaged in water-proof bags and protected from the elements on the jobsite.

2.07 CURING MATERIALS

A. The liquid membrane-forming curing compound shall meet the requirements of ASTM C-309-74, Type 2 or Corps of Engineers Specification CRD-C 300, such as "Master Seal" as manufactured by Master Builders or an approved equal.

shall be removed. All concrete shall be placed on clean damp surfaces, free from water, or upon properly consolidated fills. Concrete shall be deposited in approximately horizontal layers, not to exceed 18 inches. Concrete that has to be dropped four feet or more shall be placed through a tremie to prevent segregation.

F. Concrete shall be consolidated by means of mechanical vibrating. Vibrators shall be inserted and removed vertically at regular intervals not to exceed every 18 inches to insure uniform consolidation. In no case shall vibrators be used to transport concrete inside the forms. Internal vibrators shall maintain a speed of not less than 7,000 impulses per minute when in operation. At least one standby vibrator shall be on hand at all times. Concrete may not be ordered unless and until this extra vibrator is on the jobsite.

G. No backfill shall be placed against walls without adequate bracing to prevent cracking or displacement of the wall. All basin type structures shall be protected against flotation until they are completed and backfilled.

H. All exposed edges of concrete shall be finished with one inch chamfer.

3.05 CONSTRUCTION JOINT TREATMENT

A. Shear keys, if any, shall be where shown on the drawings. The sectional dimensions shall be 2" x 4" (nominal) unless otherwise noted.

B. Construction joints to receive fresh concrete shall be thoroughly cleaned and free from laitance, fins, and other deleterious material. The surface to receive concrete shall be roughened by a method approved by the Engineer so as to expose the larger aggregates in the hardened concrete surface.

C. Exposed construction joints shall receive treatment as noted on the drawings for the specific surface.

3.06 REINFORCEMENT AND ACCESSORIES

A. In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs.

B. The Contractor shall provide for the installation of inserts, pipe sleeves, drains, hangers, metal ties, anchor slots and other devices shown on the Construction Drawings or as necessary to complete all elements of the contract.

C. Openings for Pipes and Joints to Pipes

1. Pipes shall not be fixed in concrete wall or interior floor pours. Holes of a diameter one inch greater than the outside pipe diameter shall be formed accurately to pipe layout dimensions or shall be cored (10 inch diameter and under) in existing concrete slabs or walls.

2. When piping is placed, the annular ring around it be caulked from both sides with dry braided hemp (or unbraided where pipes do not center or grout closure is not necessary), to within one inch of wall surface or two inches if grout closure is necessary. Where exposed to view, inside basins, or where water tightness, air-tightness, support or prevention of vibration is necessary, the remaining annular ring at the surface shall be troweled full with a grout of one part Portland Cement, 1 1/2 parts sand and a nonshrink compound, Master Builder's "Embeco", or equal, in quality and according to directions of the manufacturer. Then the joint shall be raked back 1/2 inch from the surface and filled with a one to two mix grout of Portland Cement and sand. Such joints shall be water and seepage tight.

3. Where malleable pipe (steel, wrought iron, or copper), brittle pipe (hard rubber), rubber hose, or any pipe cut to fit on the job, passes through any concrete slab, floor or wall, a wrought or cast iron pipe nipple with about 1/2 inch greater diameter than the outside of the pipe shall be used as a sleeve and cast into the slab. In case of floors above ceilings, these sleeves shall extend 1/2 inch to one inch above floor surface, to prevent cleaning water from running into them.

4. Where holes greater than 10 inch diameter have to be cut for pipe in existing concrete slabs or walls, the space about the pipe shall be formed to original surfaces and the pipe wrapped with 1/2 inch braided hemp. In grouting this space, use a mixture of Portland Cement, one part, and a concrete sand, 1 1/2 parts, with the addition of a compound which will prevent shrinkage of the grouting. Use Master Builder's "Embeco" or equal, according to the manufacturer's directions. Where walls and spaces give sufficient room for safely using large aggregate, this may be added in a quantity equal to the sand specified. After removal of forms, the yarn shall be removed for a depth of two inches from water side and/or exposed surfaces, and the space refilled to surface with a grout of one part cement, one and one-half parts sand, and a nonshrink compound, Master Builder's "Embeco",

or equal, in quantity recommended by the manufacturer. Then the joint shall be raked back 1/2 inch from the surface and filled with a one to two mix grout of Portland Cement and sand.

3.07 FOUNDATION PREPARATION

A. All foundation slabs and footings and column footings of structures shown to be supported on rock shall be poured on rock or material ordered by the Engineer to extend bearings to rock. Such material shall normally be Class "B" concrete, but the Engineer can order Class "A" and/or compacted dense graded aggregate to establish rock bearing Concrete and/or compacted DGA, which are not shown or indicated on the drawings, but are required to obtain rock bearings because of changed conditions shall be paid for in accordance with unit price bid, if the Engineer orders the bearing materials installed. Bearing material (concrete and/or compacted DGA) ordered by the Engineer to correct over excavation or ruin of subgrade by Contractor's operations shall be paid for by the Contractor. The Contractor shall be responsible to preserve acceptable foundation bearing material including shale rock.

B. The subgrade for all foundation slabs and footings and column footings shall be inspected and approved by the Engineer prior to any construction thereon.

C. Rock lines shown on plans are approximate only.

3.08 FINISHING

A. Defects

1. After removal of forms, all unsightly ridges or lips shall be removed and undesirable local bulging on the surface to be permanently exposed shall be remedied. Remove blemishes and form marks. The finished surface shall be uniform, smooth and clean.

B. Horizontal Surfaces

1. All exposed horizontal concrete surfaces shall receive a smooth uniform trowel finish except that floors and walkways shall receive a light broom finish. Grout shall be worked to the surface of a concrete by hand, jitterbug, or machine for finishing, and in no case shall grout for finishing be added to the surface of the concrete nor shall cement be used to dry the surface.

C. Joints and exposed edges which are not chamfered shall receive rolled edges.

D. Water tightness

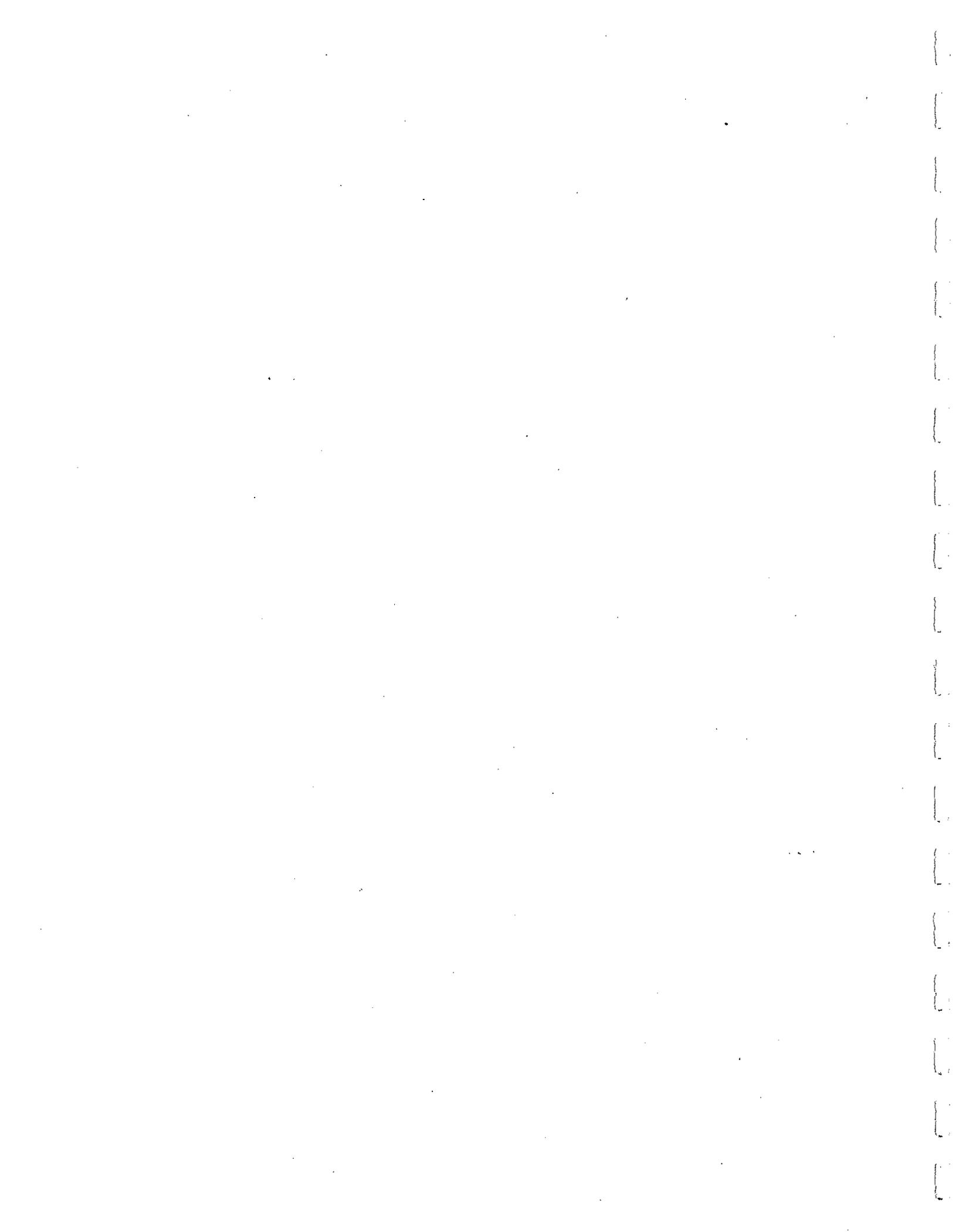
1. All concrete, when finished, must be watertight. Exposed concrete surfaces shall show no dampness when the interior of basins or exterior of pits have been filled with water for seven days. In case any leakage or dampness shows on the surface of any such walls after the time stated, then such defects must be remedied by the Contractor and work will not be accepted until this is done.

E. Application

1. The pre-mixed hardener shall be applied to all interior floors (to receive equipment or to be walked upon) at a rate of 0.6 pounds per square foot.
2. Apply to the floated concrete adjacent to forms, columns and walls where moisture will be lost first. Apply two-thirds of the specified total shake immediately following floating of total area.
3. Spread evenly and do not throw the shake.
4. Mechanical trowels with float blades shall be used as soon as shake has taken moisture (indicated by darkening of surface). Do not allow float blades to dig into the surface. Float just sufficiently to bring moisture from base slab through the shake.
5. Plan timing of this procedure so that sprinkling water on the surface will not be necessary.
6. Immediately following the floating of the first shake, apply the remaining one-third of the total specified shake in the same manner and mechanically trowel as specified. (Surface shall be further compacted by a third mechanical floating if time and setting characteristics of the concrete will allow).
7. As surface further stiffens, as indicated by loss of sheen, it shall be hand or mechanically troweled with blades relatively flat. All marks and pinholes shall be removed in the final raised trowel operation.

F. Curing and Protection

1. Designated floors shall be finished with metallic - aggregate surface hardener cured with the approved membrane curing compound. Apply the membrane curing compound immediately after the floor surface has hardened sufficiently so that it will not be marred by the



SECTION 15060

METAL PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Plastic Pipe and Fittings: Section 15064

1.02 QUALITY ASSURANCE

A. Ductile iron pipe shall be used exclusively where required by the plans. Cast iron fittings may be used in contact with PVC pipe, but not with ductile iron pipe.

B. Ductile iron pipe shall comply with the following standards:

1. AWWA C151-76 and ANSI A21.51-76, "American National Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids".
2. AWWA C150-76 and ANSI A21.50-76, "American National Standard for the Thickness Design of Ductile Iron Pipe".
3. AWWA C111-80 and ANSI A21.11-80, "American National for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings".
4. AWWA C115-75 and ANSI A21.15-75, "American National Standard for Flanged Cast-Iron and Ductile-Iron Pipe with Threaded Flanges".
5. AWWA C110-75 and ANSI A21.10-77, "American National Standard for Gray-Iron and Ductile-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids".
6. AWWA C104-80 and ANSI A21.4-80, "American National Standard for Cement-Mortar Lining for Cast-Iron and Ductile-Iron Pipe and Fittings for Water".

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer, three (3) copies of descriptive literature on ductile iron pipe, fittings and jointing prior to ordering.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE

- A. Pipe shall have a working pressure of 350 psi.
- B. Pipe shall be ANSI Thickness Class 50.
- C. Pipe shall be as manufactured by Clow or equal.

2.02 DUCTILE OR CAST IRON PIPE FITTINGS

- A. All fittings shall be manufactured for the size and pressure class of the pipeline in which they are to be used.
- B. All fittings shall be furnished complete with all joint accessories.

2.03 DUCTILE IRON PIPE PUSH-ON JOINTS

- A. Joints in mains shall be push-on type with belled end and gasket.
- B. Joints shall have 350 psi working pressure rating.
- C. Joints shall be Clow Super Bell-Tite Joint or equal.

2.04 DUCTILE IRON PIPE FLANGED JOINTS

- A. In buildings or where shown on the plans, flanged jointing shall be required.
- B. All buried ductile iron pipe shall have standard cement lining on the inside and bituminous coating on the outside.
- C. In buildings, ductile iron pipe shall have an epoxy-based exterior paint coating (8-10 mil thickness) and either a cement or epoxy-phenolic interior lining.

PART 3 - EXECUTION

3.01 TRENCHING, BACKFILLING AND COMPACTION

- A. Trenching, backfilling and compaction shall conform with Sections 02221 of these specifications.

3.02 JOINTING

A. Jointing shall be per manufacturer's recommendations and in accordance with Section 15064, Article 3.02.

3.03 PRESSURE TESTING

A. Hydrostatic testing of cast iron and ductile iron fluid pipe is required and shall be in accordance with AWWA C106 for pipe cast in metal molds and C108 for pipe cast in sand lined molds.

3.04 DISINFECTION

A. Disinfection shall be conducted in accordance with procedures outlined in Section 15064, Article 3.04.

END OF SECTION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 15064

PLASTIC PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Plastic pipe shall be used as shown on the drawings.
- B. Related Work Specified Elsewhere:
 - 1. Trenching, Backfilling and Compaction: Section 02221

1.02 QUALITY ASSURANCE

A. Polyvinyl Chloride (PVC) pipe shall satisfy the following standards:

- 1. ASTM D 1784 concerning PVC extrusion compound cell classification.
- 2. ASTM D 2254, "PVC Plastic Pipe (SDR-PR)".
- 3. ASTM D 2672, "Bell-End PVC Pipe"
- 4. National Sanitation Foundation "Seal of Approval Listing of Plastic Materials, Pipe, Fittings and Appurtenances for Potable Water and Wastewater".
- 5. Pipe jointing shall meet the following requirements:
 - (a) Integral bell gasketed joints shall be laboratory tested in accordance with Section 4, Laboratory Performance Requirements as defined in Uni-Bell Recommended Standard, UNI-B-1, Thermoplastic Pipe Joints, pressure and non-pressure applications.

B. Polyvinyl chloride (PVC) C 900 Class 150 or Class 200 pipe shall satisfy the following standards:

- 1. AWWA C 900, Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch for water, which references ASTM and NSF Standards, for pipe couplings and jointing materials.

C. Polyethylene pipe shall be NSF approved, SDR 13.

D. Applicable standards may be obtained at the following addresses:

- 1. American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103
(215) 569-4200
- 2. National Sanitation Foundation
P.O. Box 1468
Ann Arbor, Michigan 48106
(313) 769-8010

3. Uni-Bell Plastic Pipe Association
2655 Villa Creek Drive, Suite 164
Dallas, Texas 75234
(214) 243-3902

4. American Water Works Association
6666 West Quincy Avenue
Denver, Colorado 80235

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer for approval, three copies of data sheets on the selected plastic pipe as well as fittings and adapters prior to ordering and shipment of materials to the site.

PART 2 - PRODUCTS

2.01 PVC PIPE

A. Where Class 160 PVC pipe is shown on the plans, pipe shall be ASTM D 2241, SDR 26. Class 200 PVC pipe shall be SDR 21. Where C 900 DR 18 and C 900 Class 200 PVC pipe shall be DR 14.

B. Pipe shall have standard 20 or 40 foot lengths.

C. Integral bell jointing is required. Gaskets shall be factory-installed unless otherwise approved. When not factory-installed, gaskets shall be furnished by the pipe manufacturer.

D. Pipe shall be as manufactured by RobinTech, Johns-Manville, Clow or equivalent.

2.02 PVC FITTINGS

A. All ells, bends, reducers and tees and other fittings shall be mechanical joint ductile iron as recommended by the pipe manufacturer.

B. The dry fit of fittings and coupling sockets must be snug.

C. Elbows and bends shall be long radius.

2.03 LUBRICANT

A. Lubricant to be applied to bevelled spigot end prior to insertion into belled end of pipe shall be as provided or recommended by the pipe manufacturer.

2.04 ADAPTERS

- A. Adapters shall be required for connecting PVC pipe to dissimilar piping materials; subject to approval by the Engineer.
- B. Transition gaskets shall be used to connect ductile iron ells, bends, tees and reducers to PVC pipe.

2.05 TRACER WIRE

- A. An electrically conductive insulated tracer wire (#14 solid copper or detectable marking tape) shall be placed alongside the main line PVC pipe for its entire length marking tape shall be installed as per manufacturer's recommendations.

PART 3 - EXECUTION

3.01 TRENCHING AND PIPE LAYING

- A. Trenchwork shall conform to Section 02221 of these specifications.

3.02 JOINTING

- A. The assembly of the gasketed joint shall be performed as recommended by the pipe manufacturer.
- B. In all cases, clean the gasket, the bell or coupling interior, and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material before assembling.
- C. Inspect the gasket, pipe spigot bevel, gasket groove and sealing surfaces for damage or deformation. Reject damaged materials.
- D. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Then push spigot end "home" until the reference mark contacts the bell.

3.03 HYDROSTATIC TESTING

- A. The PVC line shall be capped and hydrostatically tested in conformance with requirements of AWWA C 600.
- B. Prior to the test, the Contractor shall have taken the necessary steps to remove all dirt, debris and obstructions from the pipelines.

C. Where leaks are visible at exposed joints and/or evident on the surface where joints are covered, the joints shall be remade or bolts retightened or the section of pipe re-laid, and the leakage eliminated. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.

D. Each completed section of the pipeline shall be tested at maximum working pressure for two hours. Care shall be taken to ascertain that all air has been expelled from the line prior to the test. "Allowable Leakage During Pressure Testing" shall be in accordance with the acceptable standards of the regulatory agency involved.

3.04 DISINFECTION

A. No water piping installed shall be placed in service, either temporarily or permanently, until it has been thoroughly disinfected as follows:

1. After testing, a solution of hypochlorite, (HTH, or approved equivalent) shall be introduced into the section of piping to be disinfected, sufficient to insure a chlorine dosage of at least 50 ppm in the pipe. While the solution is being applied, the water should be allowed to escape at the ends of the section until tests indicate that a dosage of at least 50 ppm has been obtained throughout.

2. The lines shall be kept full of the chlorinated solution for a period of 24 hours, with a residual concentration at the end of this period of at least 25 ppm. If the initial introduction of chlorine in concentration of 50 ppm or more does not produce a residual concentration of 25 ppm at the end of 24 hours, the disinfection procedure must be repeated. The mains shall then be thoroughly flushed with water from the municipal treated water system and then connected into the system. Disinfection operations shall at all times meet the current requirements of the Kentucky Division of Water.

B. Tablets may be substituted for solution disinfectant.

C. In the disinfection of PVC lines, care should be taken to follow the manufacturer's recommendations so as not to damage the pipeline.

D. Disinfection procedures shall conform to AWWA C 601-68, "AWWA Standard for Disinfecting Water Mains".

END OF SECTION

SECTION 15080

WATER SERVICE LINES AND TAPS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Unless otherwise indicated in the Contract Documents, "Summary of Work", all work installed under this section shall be as follows:

1. The materials and products shall be furnished and paid for by the Owner.
2. Installation of all items of work shall be performed by and paid for by the Owner.

B. Work Installed

1. Taps to water main including tapping saddles, corporation stops, "quicktaps", adapters, etc.
2. Service line, including push-unders (road crossings)
3. Meter assemblies, including meters, meter setters, meter boxes and pressure regulators (where used).

C. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Pipe Boring and Jacking: Section 02224

PART 2 - PRODUCTS

2.01 QWIKTAPS

A. Dresser Qwiktaps or equal, shall be used for tapping PVC pipe. Tap shall be 3/4 inch or as noted on drawings.

2.02 TAPPING SADDLE

A. Taps to any ductile iron pipe shall be by tapping saddle and corporation stop. Tapping saddles for PVC pipe may be used in conjunction with corporation stops in lieu of dresser Qwiktaps.

B. Tapping saddle for PVC shall be Clow Style 3401 Twin-Seal or equal. Tap shall be 3/4 inch or a necessary to conform to service line size.

C. All tapping saddles shall have AWWA C 800 (Mueller) threading. Bolts shall be rust-proof.

2.03 CORPORATION STOPS

A. Corporation stops shall be used in conjunction with tapping saddles.

B. Corporation stops shall be 3/4 inch by 3/4 inch, or as required for the service line size.

C. Inlet shall have AWWA thread to match tapping saddles and outlet shall have a connection appropriate for the service line to be used.

D. Corporation stops shall be Mueller H-15000, Ford F-600, or equal.

2.04 POLYETHYLENE PIPE

A. Polyethylene pipe shall be copper tube size (OD ASTM D 2739), SDR 9, PE 3406.

B. Pipe shall be 3/4 inch unless otherwise provided during construction.

C. Pipe shall have 160 psi working pressure at 73.4 degree F.

D. Pipe shall be Driscopipe 5100 ULTA-LINE or equal.

2.05 POLYBUTYLENE PIPE

A. Polybutylene pipe shall be copper tube size (OD ASTM D2739, SDR 9, or 13.5).

B. Pipe shall be 3/4 inch unless otherwise noted on the drawings.

C. Pipe shall have 250 psi working pressure at 73.4 degree F. (SDR 9) or 160 psi (SDR 13.5).

D. Pipe shall be Clow Polybutylene or equal.

2.06 COPPER PIPE

A. Pipe shall be standard 3/4 inch copper water service pipe.

B. Pipe shall have 160 psi working pressure at 73.4 degree F.

2.07 FITTINGS

A. All fittings and adapters, shall be as needed to perform the work.

2.08 METERS

A. Unless otherwise shown on the plans, meters 5/8" X 3/4", readings in gallons shall be used.

2.09 METER SETTERS

A. Meter setter for meter only shall be copper 5/8" X 3/4", horizontal inlet and outlet, with lock-wing stop, and with multi-purpose end connections on both inlet and outlet, such as Mueller Series H-14004 or equal (with check valve).

B. Meter setters for meter and pressure regulator shall be Tandem Copper setters with lock-wing stop, 5/8" x 3/4" with multi-purpose end connections on both inlet and outlet, and adapters for regulators, such as Ford TV72-15 or equal.

2.10 METER BOXES

A. Meter box shall be Lemac White Plastic Meter Box or standard black fiber meter box.

B. Meter boxes shall have 30-inch height, 18-inch diameter.

2.11 METER BOX LIDS

A. Meter box lids 18-inch diameter, 11-inch lid opening, 4-inch depth, cast iron, small opening nut, stamped WATER METER, such as Mueller H-10810 or equal.

2.12 PRESSURE REGULATOR AND STRAINER

A. Pressure regulator. if noted for installation, shall be diaphragm type, cast bronze, stainless steel seat ring with strainer, such as Mueller H-9300, regulator Number 2, size 3/4 inch or equal.

PART 3 - EXECUTION

3.01 QWIKTAP

A. Installation shall be in strict accordance with manufacturer's recommendations. In addition, the Engineer may require use of wrapping tape around service line insert to secure a tight fit if the need arises.

B. The Contractor shall leave slack in the service line near the tap to avoid pullout from water pressure forces.

3.02 TAPPING SADDLES AND CORPORATION STOPS

A. Saddles, corporation stops and connection to service pipe shall be installed so as to obtain positive seal.

3.03 SERVICE LINE

A. Trenching and backfilling shall conform to Sections 02221 and 02223 in all particulars, except that depth of bury shall be adjusted to slope gradually to meet the inlet hole at the meter box.

B. Road crossings shall be installed by pushing as per Section 02224 of these specifications.

3.04 METERS

A. Meters shall be installed in accordance with the Standard Detail WL 300.

B. All connections shall be watertight.

C. The meter setter shall be capped at the outlet inside the meter box.

D. The earth beneath the meter inside the meter box shall be flat and all loose dirt removed.

END OF SECTION

SECTION 15101

GATE VALVE ASSEMBLIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Metal Pipe and Fittings: Section 15060
2. Plastic Pipe and Fittings: Section 15064

1.02 QUALITY ASSURANCE

A. All gate valves shall equal or exceed the requirements of AWWA C 500-80.

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer, three copies of descriptive literature on all valves and valve boxes prior to ordering.

PART 2 - PRODUCTS

2.01 GATE VALVES

A. Valves shall be AWWA Type Iron Body, Double Disc, Parallel Seat.

B. Valve jointing shall be either mechanical joint for connection to iron and PVC pipe or "plastic end" for connection to PVC pipe.

C. Valves shall be cast iron with bronze or other rust-proof mountings.

D. Valves shall have minimum 150 psi working pressure, made by American, Mueller, Clow, Kennedy or as approved.

E. All valves shall be ordered with the same kind and size of wrench. Adapter nuts shall be installed where necessary and the Contractor shall furnish three five foot long "tee" wrenches to the owner at no extra cost.

2.02 GATE VALVE BOXES

A. Gate valve boxes shall be 5 1/4 inch, shaft, 2 piece, screw type or buffalo type, of cast iron construction.

B. Valve boxes shall have an extension range of 24 to 36 inches.

C. Valve box covers shall be furnished by valve box manufacturer, with lid marked "WATER".

D. Valve boxes and lids shall conform to the manufacturing standards of Bingham and Taylor, Tyler or Mueller.

2.03 TAPPING VALVES AND ACCESSORIES

A. Branch or lateral connections to in-service mains shall be made without interrupting service at the locations indicated on the plans or as directed by the Engineer during construction.

B. The tapping valves shall meet the requirements of this section for gate valves. The tapping sleeve and/or tapping crosses shall be compatible with the valve used and pipe to be tapped.

C. The installation shall be made using the proper size drill in machine as per manufacturers recommendation and as directed by the Engineer during construction.

D. Adequately sized thrust blocks shall be constructed to prevent movement of the mains at the tapping location. (See Standard Detail WL 101).

E. Valve boxes and lids shall be in accordance with Section 2.02 above.

PART 3 - EXECUTION

A. All valves shall be installed where shown on the drawings per manufacturer's recommendation. Refer to Standard Detail WL 200.

END OF SECTION

SECTION 15121

WATER PRESSURE REGULATOR

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Gate Valve Assemblies: Section 15101
2. Trenching, Backfilling and Compaction: Section 02221

B. Water pressure regulators shall be installed where noted on the drawings.

PART 2 - PRODUCTS

2.01 WATER PRESSURE REGULATORS

A. Water pressure regulators shall be Model 127W as manufactured by the Watts Regulator Company, Lawrence, Mass., or approved equal.

2.02 GATE VALVES

A. Gate valves shall conform to Section 15101 of these specifications.

2.03 BOXES

A. Boxes for housing the regulator installation shall be appropriate for the location:

1. In areas subject to traffic or farming activities, a concrete box with a cast iron lid shall be used.
2. In areas not subject to traffic as other hazards, an appropriately sized plastic meter box may be used with prior written approval of the Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Water Pressure Regulators shall be installed and adjusted in accordance with the manufacturer's recommendations.

B. A gate valve is required both upstream and downstream of the regulator, or as directed by the Engineer.

C. Standard Details illustrate the configuration for the water pressure regulator installation.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 15126

AIR VALVE ASSEMBLIES

PART 1 - GENERAL

1.01 SUBMITTALS

A. The Contractor shall submit to the Engineer, three (3) copies of the manufacturer's literature on air valves, 1 inch gate valves, and valve box covers, prior to ordering.

PART 2 - PRODUCTS

2.01 AIR VALVE

A. Valve shall have 150 psi working pressure, one inch inlet size N.P.T., 1/16 inch orifice.

B. Valve shall be two-way acting.

2.02 VALVE BOX

A. Valve box shall be 30 inch diameter standard strength reinforced concrete pipe meeting ASTM C76.

B. Valve Box (pipe) shall have bell top for receiving 30 inch diameter cover.

2.03 VALVE BOX COVER

A. Cover shall be round drainage grate perforated with eight 3/4 inch holes, such as Neenah Foundry Series R-4055 or approved equal.

2.04 TAP MATERIALS

A. Taps shall be by tapping saddle and corporation stop.

B. Tapping saddles on PVC pipe shall be Clow Style 3401 Twin Seal or equal, size 1 inch, AWWA threading.

C. Tapping saddle on ductile iron or permastran pipe shall be Clow Style 3407 or equal, size 1 inch, AWWA threading.

D. Corporation stop shall be 1 inch with AWWA inlet thread and outlet thread selected by Contractor to connect to male fitting between corporation stop and gate valve.

E. Fittings connecting the corporation stop to the gate valve and gate valve to the air valve, as needed, shall be 1 inch.

2.05 GATE VALVE

A. Gate valve shall be 1 inch bronze or brass with wheel handle, such as Mueller H-10914 or equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Underground installation shall be in accordance with Standard Detail WL 203. The Contractor shall install granular backfill (KY DOT No. 8, 9 or 57) per dimensions shown on the detail.

END OF SECTION

SECTION 15171

SAMPLE STATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Water Service Lines and Taps: SECTION 15080
2. Customer Water Assemblies: SECTION 15170

B. Sample Station shall be installed at the location indicated on the drawings or as directed on construction. The Sample Station shall be either installed in conjunction with a Customer Water Meter Assembly or at an independent location as shown on the plans or as directed on construction.

PART 2 - PRODUCTS

A. The Sample Station shall be a Model #93-WM as manufactured by The Kupferle Foundry Company to be used in conjunction with a companion sampling rod.

B. Meter Boxes, Meter Setters, Meter Box Lids shall be in accordance with Section 15170. Lines and taps shall be in accordance with Section 15080.

PART 3 - EXECUTION

3.01 GENERAL

A. The sample station shall be installed at the location shown on the plans or as directed on construction.

B. Installation shall be in accordance with the manufacturers recommendation and Standard Drawing No. WL 500.

END OF SECTION

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

SECTION 15425

BLOWOFF ASSEMBLIES

PART 1 - GENERAL

1.01 SUBMITTALS

A. The Contractor shall submit to the Engineer, three (3) copies of the manufacturer's literature on tapping saddles, assembly box (ie. meter box), box lid (drainage grate), 2-inch gate valve and 2" X 2" X 1" (3/4") tee permitting screw on hose bib, prior to ordering said materials.

PART 2 - PRODUCTS

2.01 TAPPING SADDLE

A. Tapping saddles shall be required when tapping 4-inch to 10-inch diameter mains.

B. On ductile iron, permastran or asbestos-cement mains, tapping saddle shall be Clow Style 3407, Mueller Series H-10521, or approved equal. Tap shall be 2-inch.

C. On PVC pipe, tapping saddle shall be bronze, screw type with large seat area and SBR gasket, such as Clow Style 3401 Twin-Seal Tapping Saddle or approved equal. Tap shall be 2-inch.

2.02 CORPORATION STOPS

A. Corporation Stops shall be used in conjunction with tapping saddles.

B. Corporation Stops shall be 2" X 2".

C. Inlet shall have thread to match tapping saddles and outlet shall permit direct compression coupling to copper size type polyethylene or polybutylene pipe.

D. Corporation Stops shall be Mueller H-25000, Ford F600, or equal.

2.03 TEE CONNECTION TO MAIN

A. A tee fitting installed in the main will be required when connecting to 2-inch to 3-inch "main" lines.

B. Unless otherwise approved, tee shall be molded PVC tee with adapters used to connect to dissimilar pipe materials, as necessary.

2.04 LATERAL PIPE TO BLOWOFF ASSEMBLY

A. The lateral pipe connecting the main to the blowoff assembly shall be 2-inch, 160 psi polyethylene or polybutylene pipe as defined in Article 2.04 of Section 15080. Where 200 psi pressure rating is required by the plans, lateral pipe shall be 250 psi polybutylene as defined in Article 2.05 of Section 15080. Galvanized iron pipe section shall have 2-inch male threads for connection to coupling and 2-inch gate valve.

2.05 GATE VALVE

A. Gate valve shall be bronze with wheel handle such as Mueller H-10914 or equal.

2.06 FITTINGS

A. A 2" X 2" copper to female iron pipe thread coupling shall be used to connect from copper tube size PE or PB pipe to 2-inch iron pipe with male I.P. threads.

B. A 2" X 2" X 1" or 2" X 2" X 3/4" tee shall be used inside the blowoff box. The 1-inch or 3/4-inch hose bib. The 2-inch outlet and 1-inch or 3/4-inch side shall be plugged by a screw cap.

C. The Contractor may substitute alternate fittings subject to approval, with the stipulation that 2-inch sizing is maintained from the tap to a capped drain, and a connection is provided for a 1-inch or 3/4-inch hose bib.

2.07 BLOWOFF ASSEMBLY BOX

A. Box shall be Lemac White Plastic Meter Box or standard black fiber meter box, 18-inch diameter, 30 inches deep.

2.08 BOX COVER

A. Box cover shall be round drainage grate Neenah R-4030, Clow F3810 or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Three cubic feet of rounded stone (KY DOT Number 8, 9 or 57) shall be placed beneath the blowoff assembly box and extending

beneath a concrete thrust block at the inlet to the box. Depth of placement shall be minimum 15 inches Stone shall be levelled and tamped.

B. A minimum one cubic foot concrete thrust block shall be poured at the inlet to the box, with minimum 8 inches of contact with a 2-inch galvanized pipe placed through the concrete.

C. If PVC molded tee fitting is used at the connection to 2-inch to 3-inch size mains, installation shall be per manufacturer's recommendations.

D. Installation shall be in accordance with Detail WL 204.

END OF SECTION



SECTION 15530

FIRE HYDRANT ASSEMBLIES & FLUSH HYDRANT ASSEMBLIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to the purchase and installation of fire hydrant assemblies, flush hydrant assemblies and required accessories and appurtenances.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Roadway Trenching, Backfill, Compaction and Pavement Replacement: Section 02223
3. Pipe Boring and Jacking: Section 02224
4. Plastic Pipe and Fittings: Section 15064
5. Gate Valve Assemblies: Section 15101
6. Metal Pipe and Fittings: Section 15060
7. Cast-In-Place Concrete: Section 03300

1.02 QUALITY ASSURANCE

A. Quality Assurance shall be provided by the Owner - observation and testing by the Engineer.

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer three copies of the descriptive literature for the hydrant assemblies and accessories and appurtenances, before they are ordered.

PART 2 - PRODUCTS

2.01 FIRE HYDRANT ASSEMBLIES AND FLUSH HYDRANTS

A. Fire hydrant assemblies shall be Mueller Centurion fire hydrants model A423, conforming to AWWA Standard 502 or equal as approved by the engineer and shall conform to the following requirements.

1. Have a main valve opening of 5 1/4 inches.
2. Operating pressure equal to 150 psi and tested to 300 psi.
3. Have two 2 1/2 inch diameter hose nozzles and one 4 1/2 inch diameter pumper hose nozzle. All nozzles to have National Standard Firehose Thread.
4. Each assembly shall be equipped with a safety flange and safety stem coupling to minimize impact damage.

5. The operating nut shall be 1 1/2 inch standard pentagon shape and shall open the main valve when turned in the counter clockwise direction.
6. Automatic hydrant drains are required.
7. Hydrant caps to be provided with chains attached to the hydrant.
8. The hydrant body shall be fire hydrant red and the hydrant bonnet shall be silver. The paint shall be applied by the manufacturer with "touch up" in the field by the Contractor.
9. The hydrant shoe inlet opening shall be six inches I.D. and of the slip-on type, unless otherwise noted on the drawings.
10. The length of the extension barrel required shall be determined for each installation. The barrel shall be coated with a pitch tar varnish to prevent corrosion.
11. All accessories shall be from the same manufacturer as the hydrant.

B. Auxiliary gate valves shall conform to Section 15101 of these specifications.

C. Flush Hydrants

1. Flush hydrants shall be the "Eclipse No. 2 - Tamper Proof" (above grade) or Eclipse #85 (below grade) as manufactured by the John C. Kuperferle Foundry, or approved equal.
2. The hydrant shall be equipped with a 2 1/2 inch nozzle(s) with "Natural Standard Firehose Thread".
3. The hydrant inlet shall be three inches I.D. and of the mechanical joint type unless otherwise noted on the drawings.
4. The length of the extension barrel required shall be determined for each installation. The barrel shall be coated with pitch tar varnish to prevent corrosion.
5. Appropriate operating wrenches shall be provided in the numbers called for in the contract.

PART 3 - INSTALLATION

A. Fire Hydrants and Flush Hydrants

1. Hydrants shall be installed where indicated on the drawings.
2. Hydrants shall be installed vertically and according to the Standard Drawing WL 201 and/or WL 202 of these specifications and according to the manufacturer's recommendations.

B. Auxiliary Valves shall be installed where indicated on the drawings and according to the Standard Detail on the drawings and Section 15101 of these specifications.

C. Concrete Thrust Blocks

1. Concrete for concrete thrust blocks shall be Class "B" conforming to Section 03300 of these specifications.
2. Concrete thrust blocks shall be of the appropriate configuration and have the required bearing area against undisturbed soil as determined by Standard Drawing WL 101.

PART 4 - TESTING

A. Hydrants and auxiliary gate valves shall be pressure tested in conjunction with the testing of the water mains, no leakage will be allowed.

B. Hydrants and auxiliary gate valves shall be operated at maximum operating pressure to determine that they are functioning properly. Any problems with the functioning of the hydrants or valves shall be corrected by the Contractor prior to final acceptance of the work.

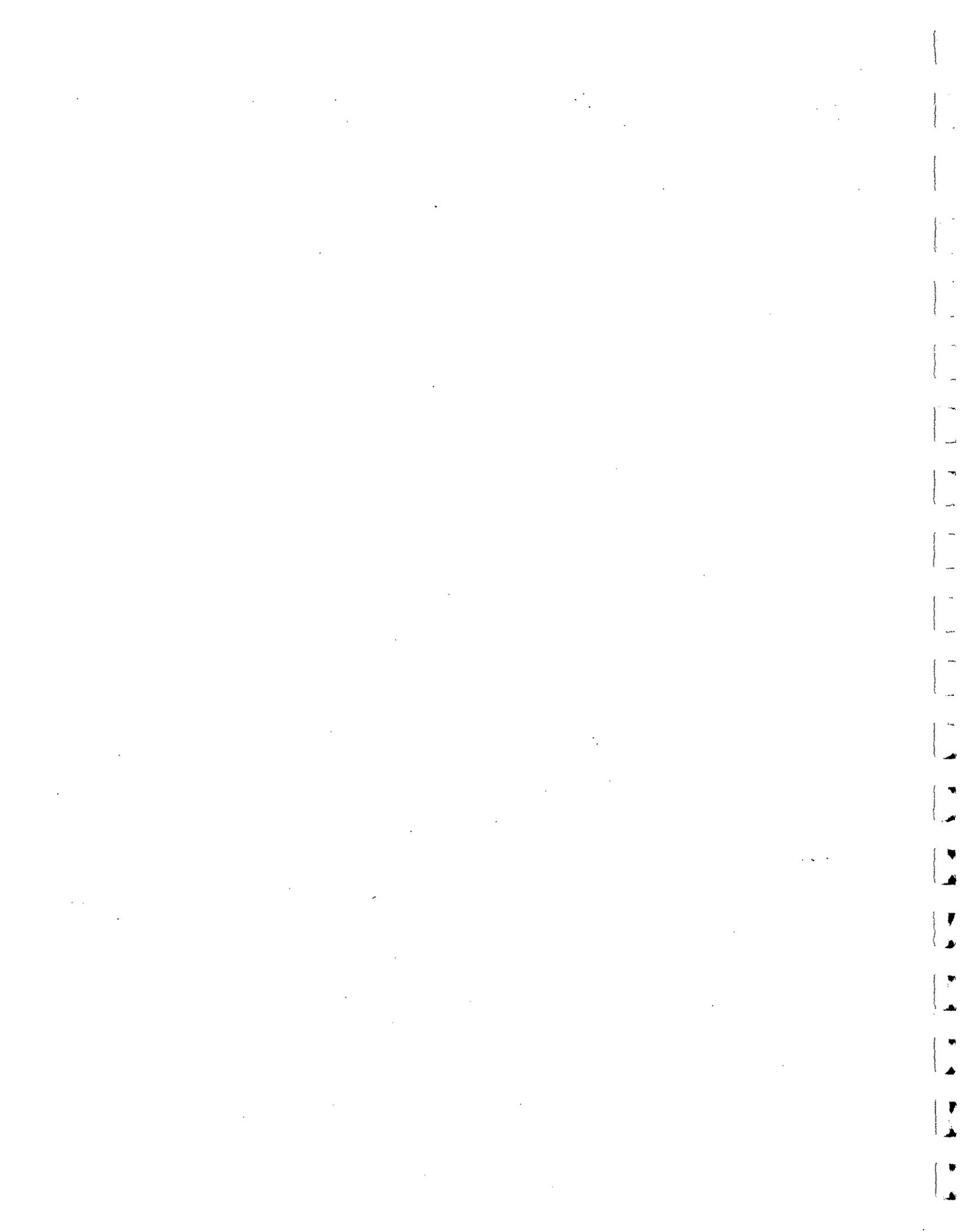
END OF SECTION

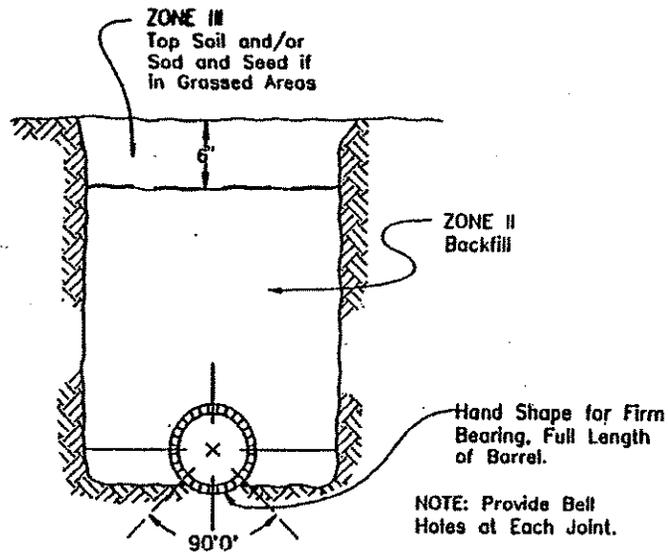
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SECTION 50000

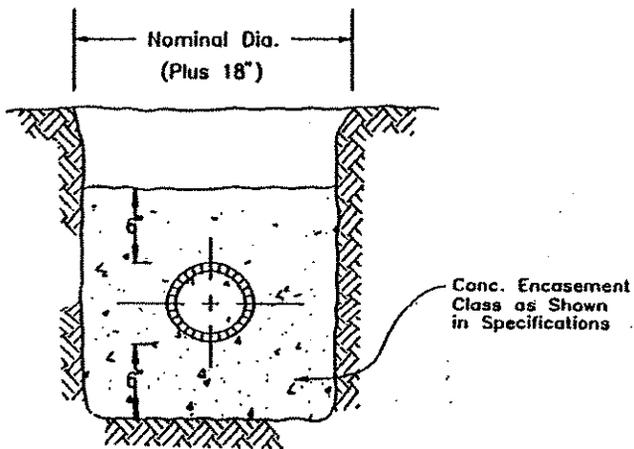
STANDARD DRAWINGS - WATER LINE

WATER LINE BEDDING & BACKFILL	WL 100
THRUST BLOCKS	WL 101
INSTALLATION DETAIL - UNDER FIELD TILE	WL 102
PAVEMENT BEDDING & PLACEMENT	WL 103
STREAM CROSSING BEDDING & PLACEMENT	WL 104
TYPICAL HIGHWAY/ROAD CROSSING DETAIL	WL 105
GATE VALVE ASSEMBLY	WL 200
FIRE HYDRANT ASSEMBLY	WL 201
FLUSH HYDRANT ASSEMBLY	WL 202
AIR VALVE ASSEMBLY	WL 203
TYPICAL BLOWOFF	WL 204
PRESSURE REDUCING VALVE (PRV) ASSEMBLY	WL 205
SAMPLE STATION	WL 500

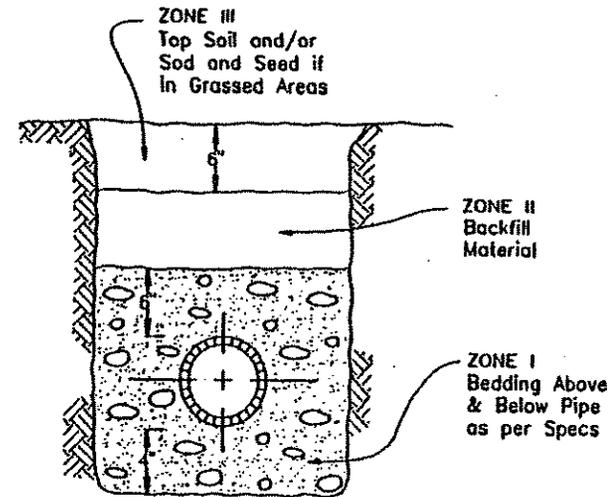




EARTH BACKFILL/BEDDING



CONCRETE ENCASEMENT



GRANULAR BEDDING

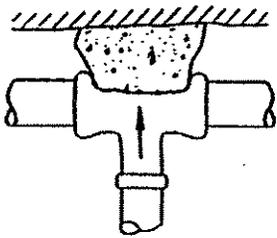
NOTES

1. Granular Bedding to 6" below pipe shall be placed in all Solid Rock trenches.
2. Zone II Backfill:
 - (a) Backfill to 12" above pipe shall be hand placed with No Rocks.
 - (b) Backfill at street & roadway crossings and at locations shown on the plans shall be compacted in 6" layers to the full trench depth, as per specifications.
3. No rock allowed in Zone III Backfill.

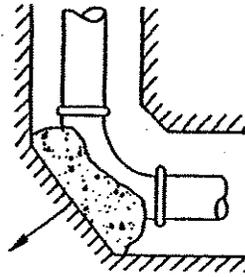
DETAILS FOR TRENCHING, LAYING
AND BACKFILLING OF WATER PIPE

NOT TO SCALE

Std. Drawing No. WL 100

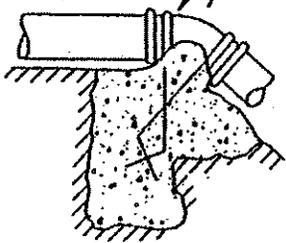


"A"



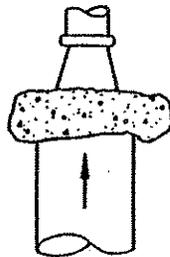
"D"

Strap Tensile Strength
30,000 lbs



UP DIRECTIONAL
CHANGE APPLICATION

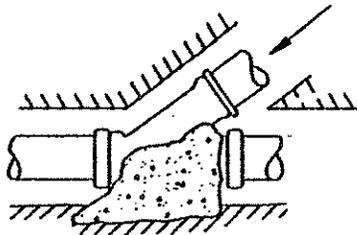
"B"



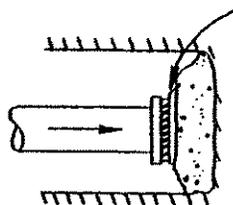
REDUCER

"E"

16 Gauge Metal
Plate Behind Plug



"C"



"F"

→ DENOTES FORCE

ESTIMATED SOILS BEARING VALUES

SOIL TYPE	LBS/FT ²
Muck, Etc.	0
Soft Clay	500
Sand	1,000
Sand & Gravel	1,500
Sand & Gravel w/ Clay	2,000
Sand & Gravel (Cemented w/ Clay)	4,000
Hard Pan	5,000

Calculate the thrust block bearing surface (FT²) required on undisturbed soil.

THRUST FORCES PER 100 psig

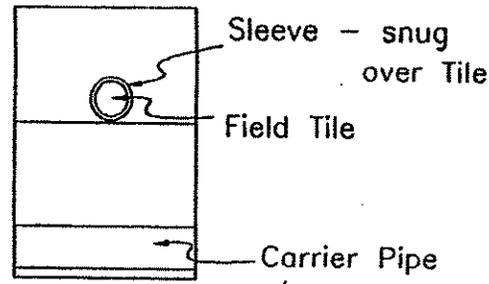
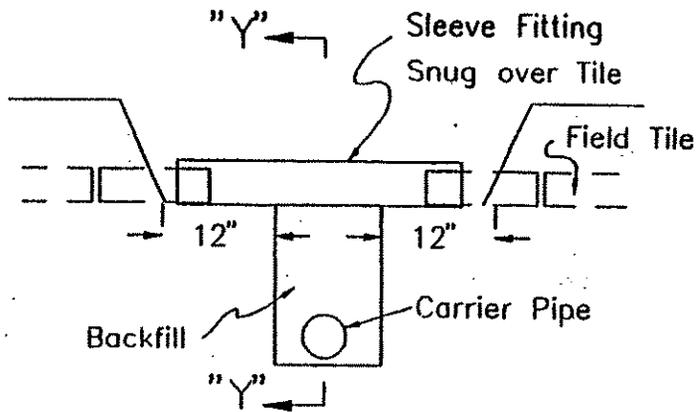
PIPE SIZE	90° ELL	45° ELL	VALVES, TEES DEADENDS
1-1/2	300	200	200
2	500	300	400
3	1,000	600	800
4	1,800	1,100	1,300
6	4,000	3,300	2,900
8	7,200	4,100	5,100
10	11,200	6,300	7,900
12	16,000	9,100	11,300

NOTE: Conc. Class as per specifications.

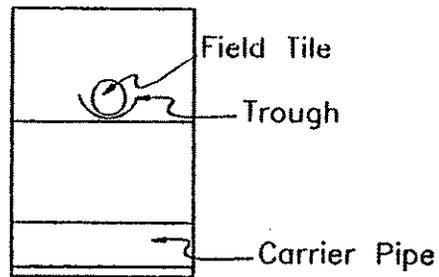
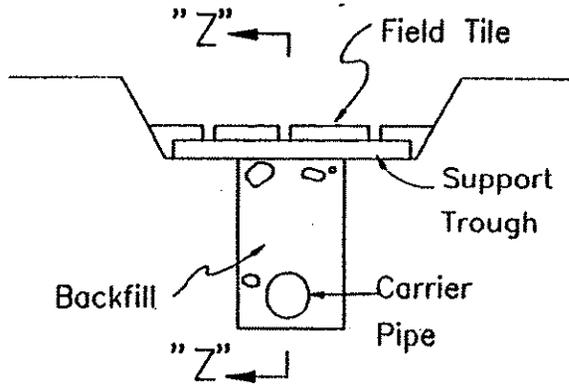
CONCRETE THRUST BLOCKS & PLUGS SECTIONS A - F

NOT TO SCALE

Std. Drawing No. WL 101



SECTION "Y-Y"



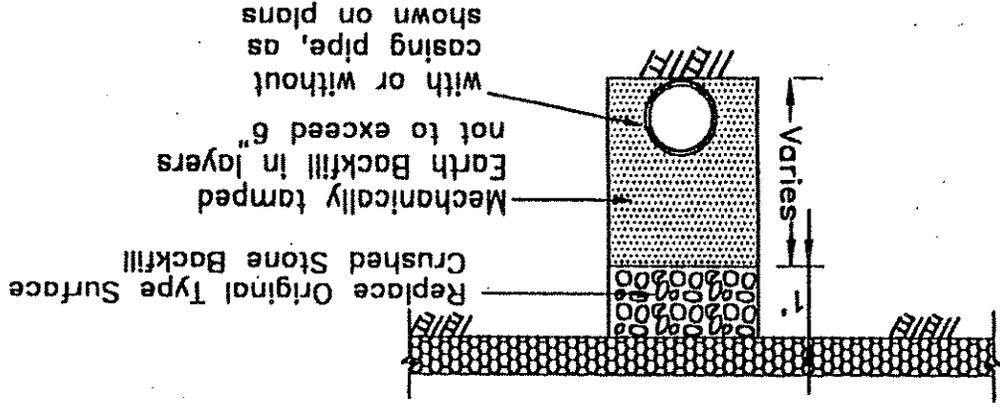
SECTION "Z-Z"

CROSSING UNDER FIELD TILE

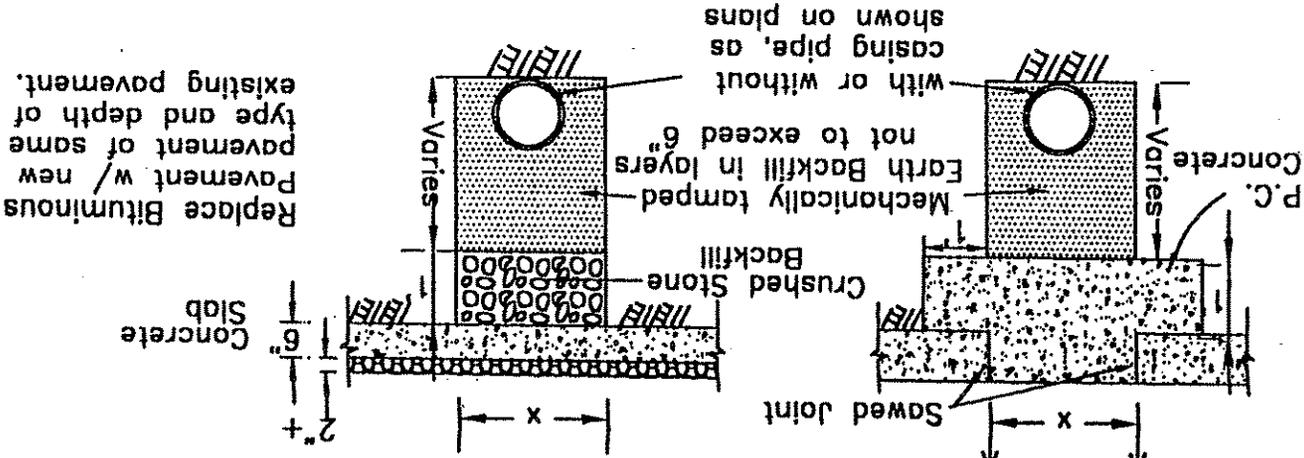
NOT TO SCALE

Std. Drawing No. WL 102

OPEN-CUT CONSTRUCTION
FOR CONCRETE & BITUMINOUS SURFACES
PAVEMENT REPLACEMENT & BEDDING



BITUMINOUS SURFACE LESS THAN 2" & TRAFFIC
BOUND MACADAM



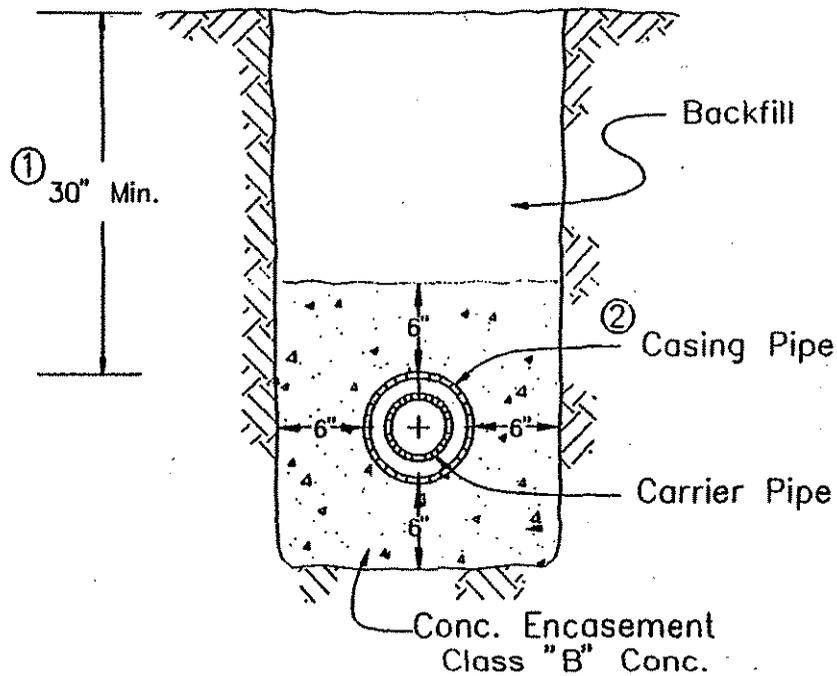
Replace Concrete
Pavement w/ new
type and depth of
existing pavement.

Replace Bituminous
Pavement w/ new
type and depth of
existing pavement.

Note: From Points "A" (Concrete
Pavement) distance to nearest
joint or break in pavement
must be six (6) feet or more.
If less than six (6) feet, remove
pavement to joint or break and
replace entire slab.
Concrete slab under Bituminous
surface to exceed 12 inches on
each side to ditch.
For backfill density requirements
see Section 02221 - 2.06E.
For Flowable Backfill "S"
See Section 02223 "S"

X=width of Excavation

Water Surface



NOTES

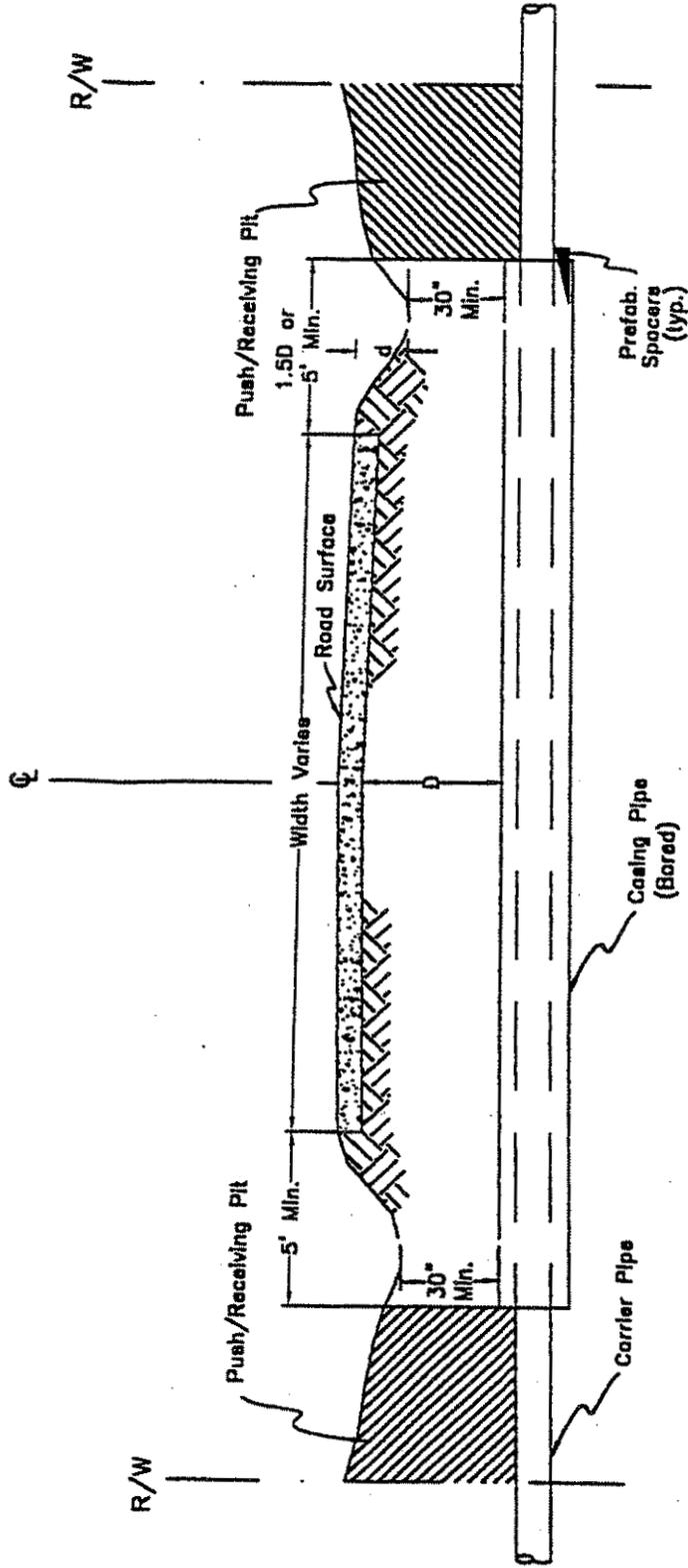
- ① For non-erodible Channels (Rock) the min. clear cover may be 6" (Conc.)
- ② The crossing may be with ~~or without~~ casing Casing pipe may be PVC.
- ③ The trench shall be backfilled as closely as possible to the original contour. All excess material shall be disposed of outside of the floodplain.
- ④ Any material placed for construction (pads, coffer dams, etc.) shall be removed immediately following trench closure.

STREAM CROSSING DETAIL
(SUBFLUVIAL FLOW)

STREAM CROSSING DETAIL
FOR TRENCHING, LAYING
AND BACKFILLING OF WATER LINE

NOT TO SCALE

Std. Drawing No. WI 104



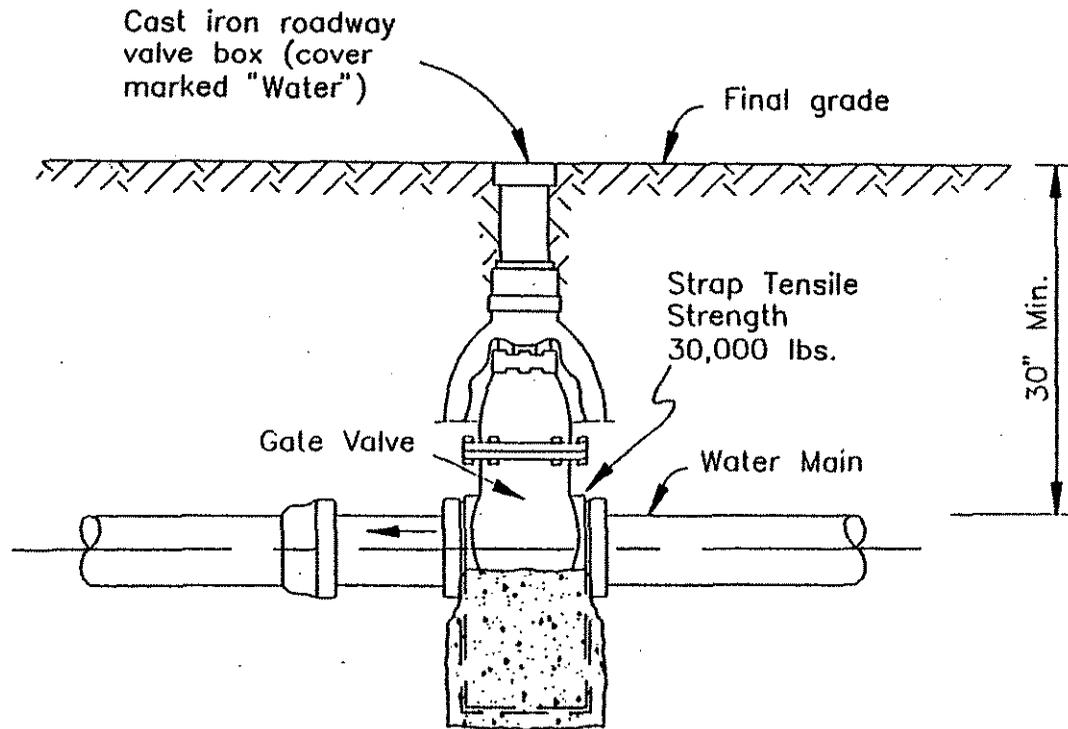
NOTES

1. d = Depth of Ditch below Road Surface.
 D = $d+30"$ min./or equal to Depth of Pipe below Road Surface.
2. Extend Casing beyond Ditch Lines.
3. All Ditch Lines are to be left open.
4. Push & Receiving Pits are to be Compacted & Backfilled as directed by the Engineer.
5. For installations using Steel Casing & PVC Carrier, Prefab. Spacers shall be installed - See Specifications.
6. Seed & straw all area disturbed during constr.

TYP. HWY / RD BORING CROSSING DETAIL

SCALE: 1" = 5'

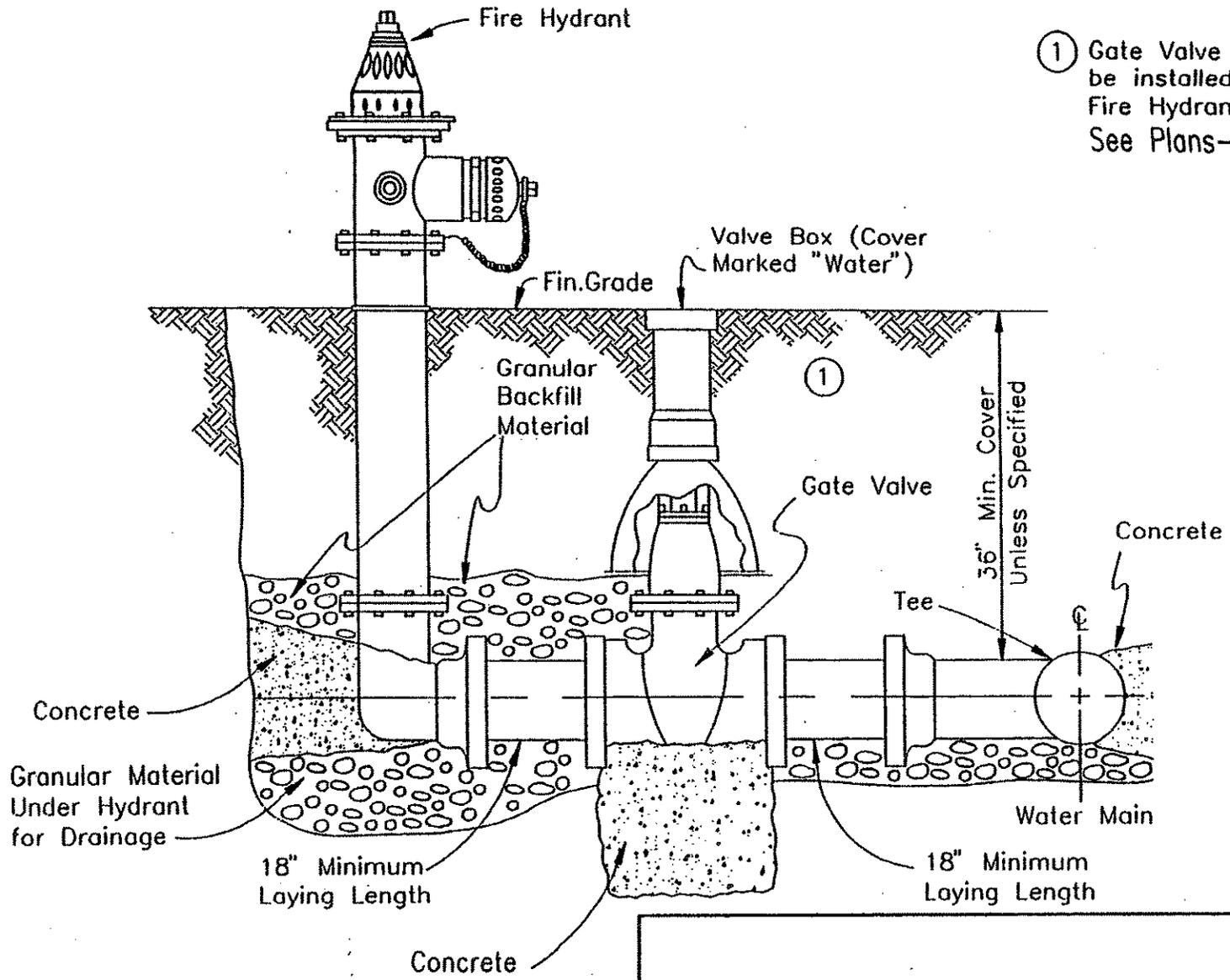
Std. Drawing No. WL 105



GATE VALVE SETTING

NOT TO SCALE

Std. Drawing No. WL 200



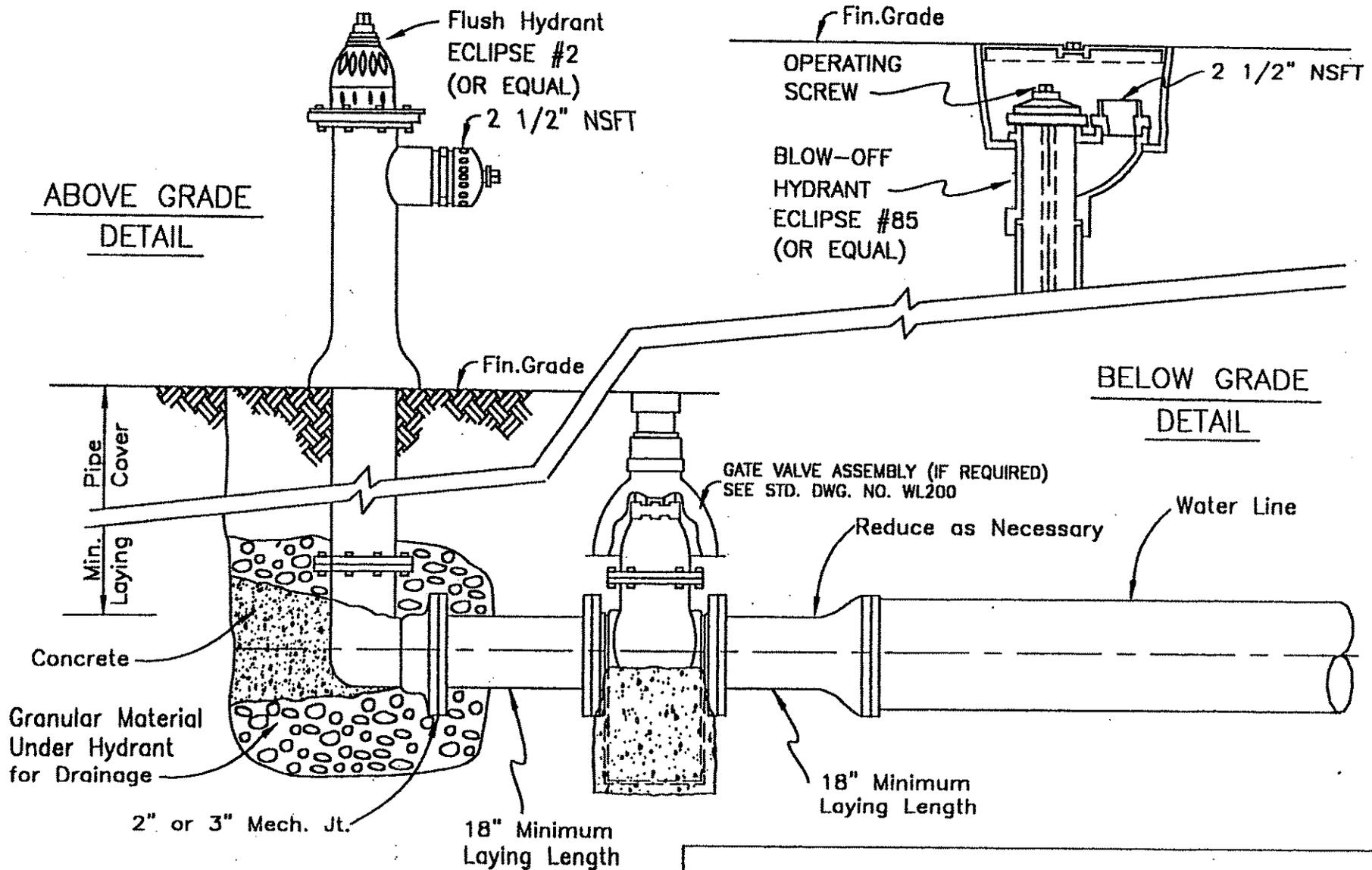
① Gate Valve may not be installed with Fire Hydrant Assembly See Plans-

FIRE HYDRANT ASSEMBLY

Hydrant Drain to be Left Clear and Operable

NOT TO SCALE

Std. Drawing No. WL 201



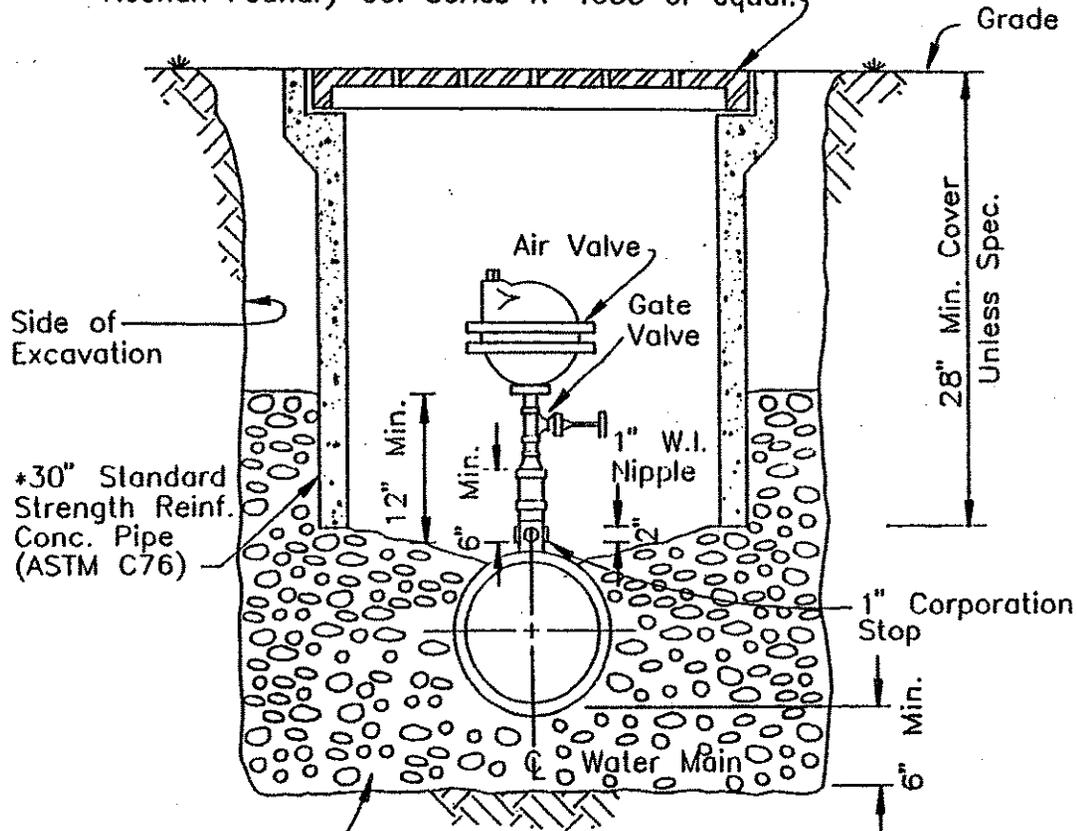
Hydrant Drain to be
Left Clear and Operable

FLUSH HYDRANT ASSEMBLY

NOT TO SCALE

Std. Drawing No. WL 202

* Round drainage grate perforated w/8 3/4" holes.
Neenah Foundry Co. Series R-4055 or equal.



Notes:

Where the main line is located in a street or road, the air release valve and box are to be located off the road where not subject to vehicle traffic, and connected to the main by 1" piping.

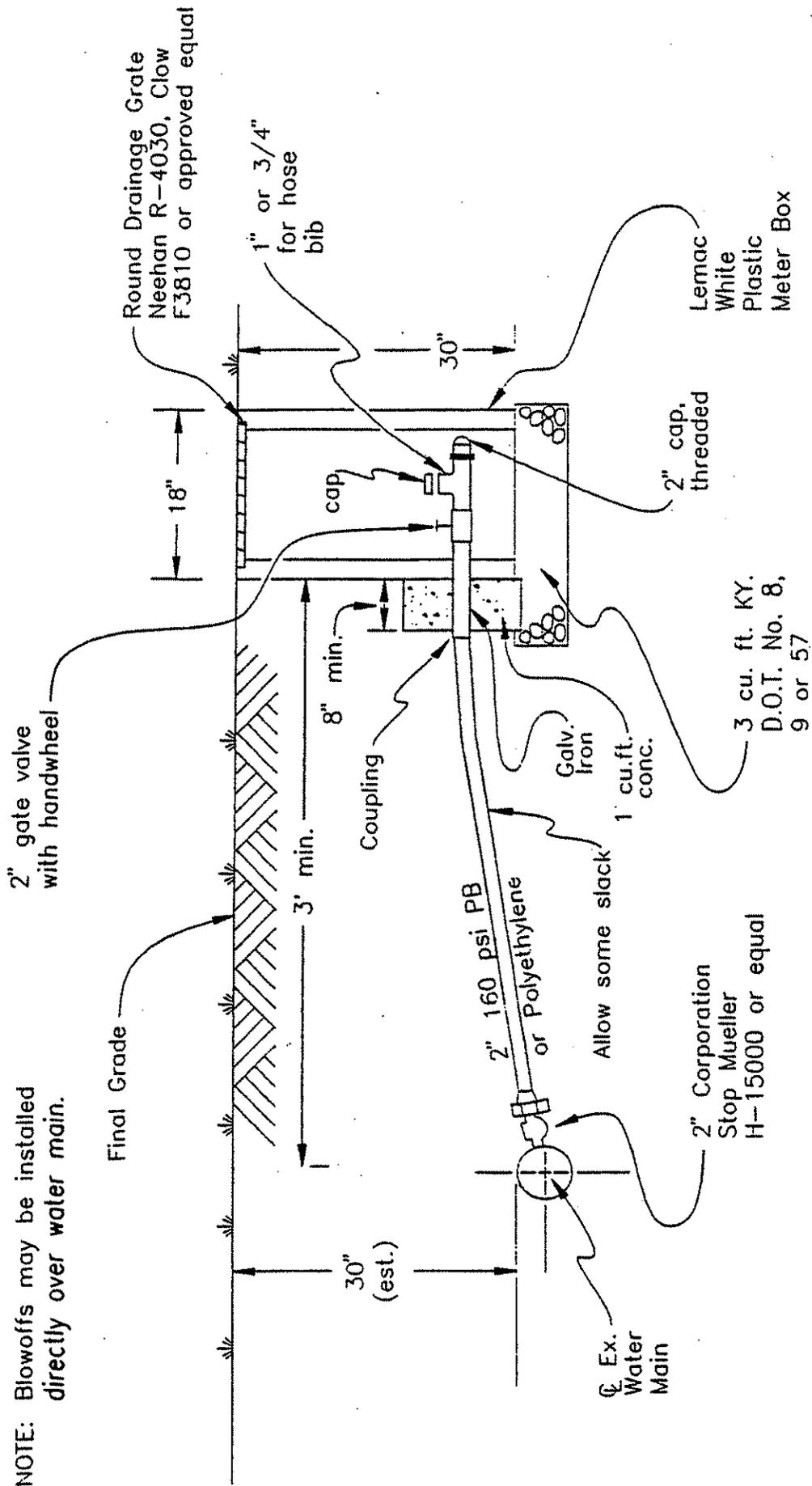
* Standard meter box may be used at location not subject to vehicular traffic.

AIR VALVE SETTING (WATER MAINS)

NOT TO SCALE

Std. Drawing No. WL 203

NOTE: Blowoffs may be installed directly over water main.



CASE 1: 4" to 10" PVC or AC
Use Corp. Stop & Tap Saddle

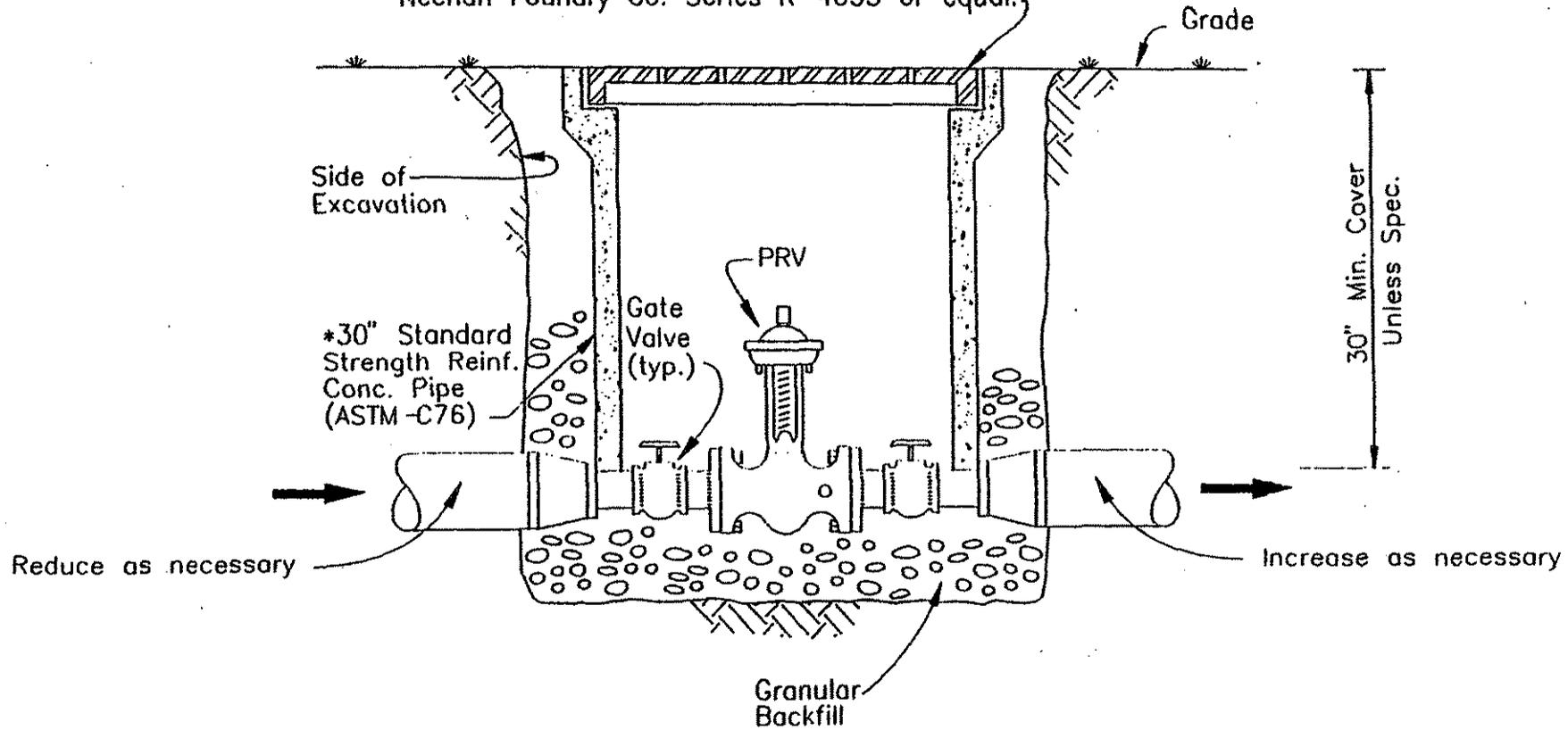
CASE 2: 2" to 3" PVC or AC
Use PVC molded fitting (tee) with direct coupling to plastic pipe and adapter to AC pipe

BLOWOFF

NOT TO SCALE

Std. Drawing No. WI. 204

* Round drainage grate perforated w/8 3/4" holes.
Neeah Foundry Co. Series R-4055 or equal.



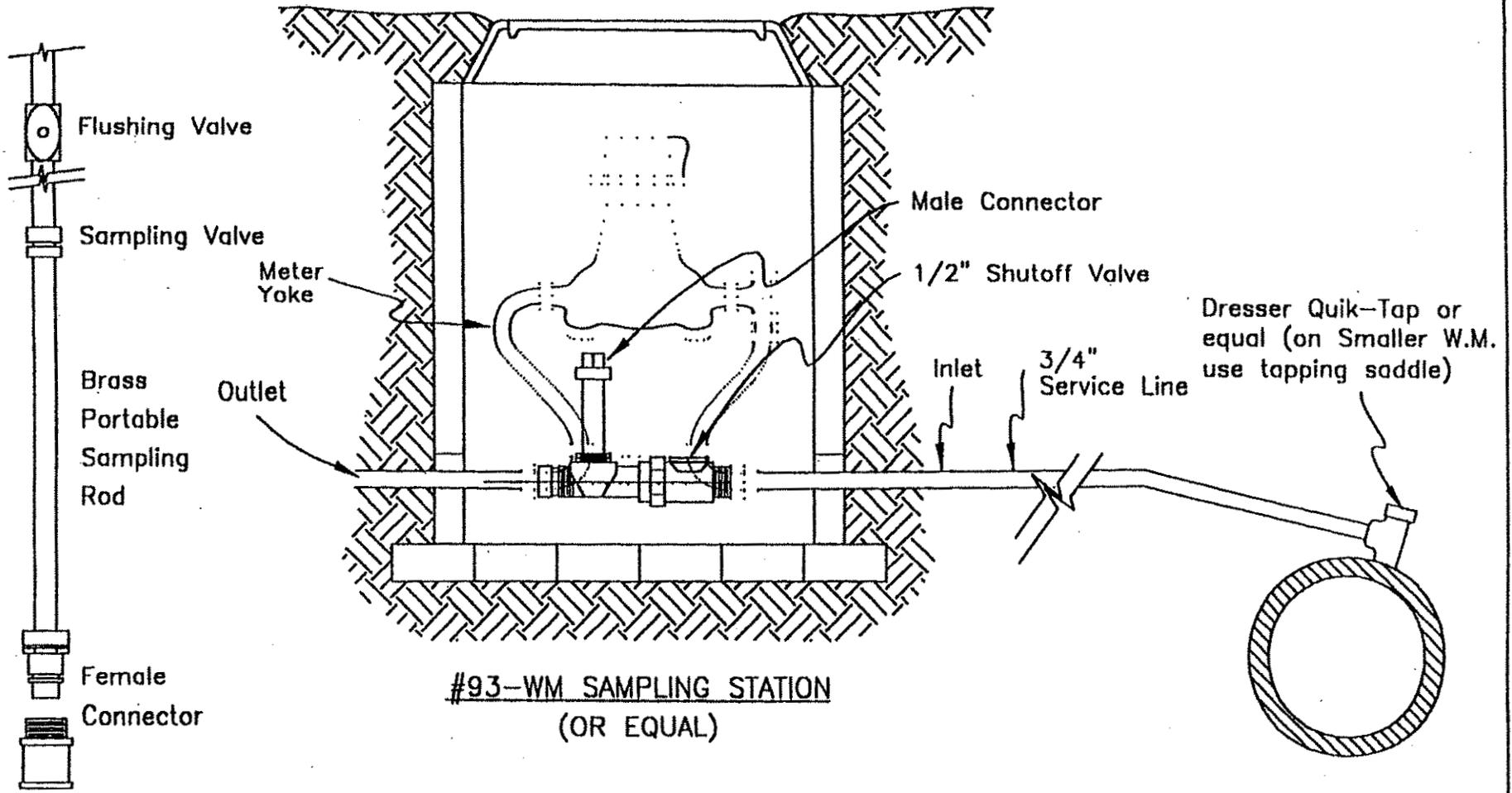
Note:

* Standard meter box
may be used at
location not subject to
vehicular traffic.

PRESSURE REGULATING
VALVE (PRV) ASSEMBLY

NOT TO SCALE

Std. Drawing No. WL 205



PORTABLE SAMPLING ROD

NOTE:
Can be used in conjunction with existing Water Meter.

SAMPLE STATION	
11-5-97	
NOT TO SCALE	Std. Drawing No. WL 500

U
N
I
T
E
D
N
A
T
I
O
N
A
L
L
I
G
N
C
E
S
A
G
R
E
E
M
E
N
T

RECEIVED

FEB - 7 2006

PUBLIC SERVICE
COMMISSION

CONTRACT VIII

300,000 GALLON ELEVATED TANK
DELISLE CURVE WATER PROJECT
BRACKEN COUNTY WATER DISTRICT
BRACKEN COUNTY, KENTUCKY



Prepared By:

HMB Professional Engineers, Inc.
3 HMB Circle, US 460
Frankfort, Kentucky 40601



TABLE OF CONTENTS

1.	Advertisement for Bids	AD-1 to AD-3
2.	Information for Bidders	IB-1 to IB-3
3.	General Conditions	GC-1 to GC-32
6.	Labor Regulations	LR-1 to LR-21
7.	Payment & Performance Bonds	PB-1 to PB-6
8.	Contract Agreement	CON-1 to CON-3
9.	Notice of Award	NA-1
10.	Notice to Proceed	NP-1
11.	Change Order Format	CO-1
12.	Special Conditions	SC-1 to SC-4
13.	Technical Specification	

DIVISION 1 - GENERAL REQUIREMENTS

Section	01010	Summary of Work	01010-1
	1041	Project Coordination	01041-1 to 01041-2
	01055	Construction Staking	01055-1 to 01055-2
	01340	Shop Drawings, Product Data and Samples	01340-1 to 01340-12
	01410	Testing Laboratory Services	01410-1 to 01410-5
	01562	Dust Control	01562-1
	01569	Safety in Water Works	01569-1
	01610	Transportation and Handling	01610-1 to 01610-2
	01611	Storage and Protection	01611-1 to 01611-2
	01630	Substitution and Options	01630-1 to 01630-3
	01640	General Equipment Stipulations	01640-1 to 01640-6
	01710	Cleaning	01710-1 to 01710-4
	01720	Record Documents	01720-1 to 01720-4
	01740	Warranties and Bonds	01740-1 to 01740-2

DIVISION 2 - SITE WORK

Section	02010	Subsurface	02010-1
	02100	Site Preparation	02100-1 to 02100-3
	02140	Dewatering	02140-1 to 02140-2
	02200	Earthwork	02200-1 to 02200-17
	02255	Crushed Stone and Dense Graded Aggregate	02255-1 to 02255-2
	02665	Water Mains and Accessories	02665-1 to 02665-27
	02933	Seeding	02933-1 to 02933-4
	02957	Erosion Control and Stabilization	02957-1 to 02957-3

DIVISION 3 - CONCRETE

Section	03300	Cast-in-place Concrete	03300-1 to 03300-28
---------	-------	------------------------	---------------------



DIVISION 13 - SPECIAL CONSTRUCTION

Section 13210 Elevated Water Tank 13210-1 to 13210-11

15. Appendix - A Geotechnical Report
B Bracken County Water District
Standard Specifications

16. Bid Schedule BS-1 to BS-5

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

ADVERTISEMENT FOR BIDS

CONTRACT VIII
DELISLE CURVE WATER PROJECT
300,000 GALLON ELEVATED TANK
BRACKEN COUNTY WATER DISTRICT
BRACKEN COUNTY, KENTUCKY

JANUARY 2006

Sealed proposals for the following work will be received by the Bracken County Water District at 103 Woodward Avenue, Brooksville, Kentucky 41004 until 1:00 p.m. (local time) January 18, 2006, for furnishing labor and materials and performing all work as set forth in this Advertisement for Bids, General Conditions, Specifications and/or Drawings prepared by HMB Professional Engineers, Inc., 3 HMB Circle, US 460, Frankfort, Kentucky 40601.

Immediately following the scheduled closing time for the reception of bids, all proposals which have been submitted in accordance with the above conditions will be publicly opened and read aloud.

The work to be bid upon is described as follows:

A 300,000 gallon elevated water storage tank including tank, tank foundation, site preparation, excavation, valve vault, and all appurtenances as shown on the plans and specification, complete in place.

Drawings, Specifications and Contract Documents may be examined at the following places:

F.W. Dodge Corporation
One Paragon Centre-Suite 230
2525 Harrodsburg Road
Lexington, KY 40504

HMB Professional Engineers, Inc.
3 HMB Circle, US 460
Frankfort, KY 40601

Builder's Exchange of Louisville
2300 Meadow Drive
P.O. Box 5398
Louisville, KY 40205

Associated General Contractors
2321 Fortune Drive, Suite 112
Lexington, KY 40505

F.W. Dodge/ABC Planroom
1812 Taylor Avenue
Louisville, KY 40213

Bracken County Water District
103 Woodward Avenue
Brooksville, KY 41004

or may be obtained from Lynn Blue Print & Supply Company, 328 Old East Vine Street, Lexington, KY 40507 upon receipt of a non-refundable payment as follows:

Contract VIII -	Bracken County Water District	
	Delisle Curve Water Project	
	300,000 Gallon Elevated Tank	\$100.00 per set

After award of a contract, the General Contractor will be furnished, without charge, a reasonable number of plans and specifications needed to prosecute the work. Subcontractors and manufacturers and suppliers shall obtain plans and specifications from the General Contractor.

Sealed proposals for the Contract shall be clearly marked on the outside of the container as follows:

"Sealed proposal for Contract VIII - Bracken County Water District - 300,000 Gallon Elevated Tank

Not to be opened until 1:00 p.m.(local time), January 18, 2006
(time and date of bid opening)

"The following addenda have been received and considered in the enclosed proposal:"

Addendum No. ____ Addendum No. ____ Addendum No.

Time allowed for completion of Contract VIII is 270 calendar days.

If forwarded by mail, the sealed envelope containing the proposal must be enclosed in another envelope and mailed to the Bracken County Water District, 103 Woodward Avenue, Brooksville, KY 41004 allowing sufficient time for such mailing to reach this address prior to the scheduled closing time for the receipt of proposals.

Bids shall be accompanied by a certified check or bid bond payable to the Bracken County Water District in an amount not less than five percent (5%) of the base bid. No bidder may withdraw his bid for a period of ninety (90) days after the date bids are opened. He may, however, withdraw his bid at any time prior to the time and date scheduled for opening of same or any authorized postponement thereof. Any bid received after the time and date specified will not be considered and will be returned unopened to the bidder.

The Bracken County Water District reserves the right to reject any and all bids and to waive formalities and any bid that is obviously unbalanced may be rejected.

Bidders must comply with the President's Executive Order Nos. 11246 and 11375, which prohibit discrimination in employment regarding race, creed, color, sex, or national origin. Bidders must comply with Title VI of the Civil Rights Act of 1964, the Anti-Kickback Act, Section 3 Segregated Facilities, Section 109 and the Contract Work Hours Standard Act.

Bidders must certify that they do not, and will not, maintain or provide for their employees any facilities that are segregated on the basis of race, color, creed or national origin.

Federal law prohibits discrimination on the grounds of race, color, national origin, religion, age, handicap, and sex in this project. Minority firms are particularly encouraged to participate.

Charles Tarvin, Chairman

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

INSTRUCTION TO BIDDERS

BIDS will be received by See Advertisement (herein called the "OWNER"), at See Advertisement until See Advertisement 20 _____, and then at said office publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to See Advertisement at _____ . Each sealed envelope containing a BID must be plainly marked on the outside as BID for _____ and the envelope should bear on the outside the BIDDER'S name, address, and license number if applicable, and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at _____ See Advertisement _____ .

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 90 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID Schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the contractor from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID bond payable to the OWNER for five percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will

return the BONDS of all except the three lowest responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A performance BOND and a payment BOND each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain the performance BOND and payment BOND within ten (10) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The OWNER within ten (10) days of receipt of acceptable performance BOND, payment BOND and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the OWNER not execute the Agreement within such period, the BIDDER may by WRITTEN NOTICE withdraw the signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The NOTICE TO PROCEED shall be issued within ten (10) days of the execution of the Agreement by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER AND CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.

A conditional or qualified BID will not be accepted.

Award will be made to the lowest responsible BIDDER.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the SUPPLEMENTAL GENERAL CONDITIONS.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

Inspection trips for prospective BIDDERS will leave from the office of the none scheduled at _____.

The ENGINEER IS HMB Professional Engineers, Inc.. The ENGINEER'S address is 3 HMB Circle, US 460, Frankfort, KY 40601.

THE
L
B
I
C
A
R
E
L
I
B
R
A
R
Y
O
F
T
H
E
U
N
I
V
E
R
S
I
T
Y
O
F
C
A
L
I
F
O
R
N
I
A

An appropriate Change Order shall be prepared and issued by the Engineer.

10. SUBSTITUTIONS

Whenever a material, article or equipment is identified on the Drawings or in the Specifications by brand name, manufacturer's name or catalog number, it shall be understood that such reference is for defining the performance, requirements, quality, capacity and other salient features of that being specified. The Contractor may recommend substitution, by brand name or catalog number, for materials, articles, or equipment provided it is of equal substance and function to that referred to in the Contract Documents. If, in the opinion of the Engineer, recommended alternates are of equal substance, function and capacity as that specified, the Engineer may approve the substitution and use by the Contractor. Any cost differential shall be adjusted in the Contract Price and the Contract Documents shall be modified by a Change Order. The Contractor shall warrant that if substitutions are approved, no major changes in function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute requested by the Contractor, shall be made by the Contractor without a change in Contract Time or Contract Price.

11. PATENTS

11.1 The Contractor shall hold and save the Owner and its officers, agents and employees harmless, from liability of any type, including cost and expenses for or on account of, any type, including cost and expenses for or on account of, any patented or unpatented inventions, process, or article manufactured and used in the performance of the Work and its intended use thereafter, unless otherwise stipulated in the Contract Documents.

11.2 If the Contractor uses any device, materials or designs covered by patent, copyright or letters, he shall provide for such use by obtaining a suitable agreement with the Owner of such patented or copyrighted material, device or design. It shall be understood and agreed by the Contractor that, without exception, the Contract Price shall include all royalties or costs arising from the use of such materials, devices and designs used in the Work. The Contractor or his Sureties shall indemnify and save harmless the Owner from any and all claims for infringement by reason of use of such patented or copyrighted device, materials, or design or any trademark in connection with the Work to be performed within the scope of the Contract Documents and shall indemnify the Owner for any costs, expenses or damage which by reason of infringement may be due and payable after completion of the Work.

12. SURVEYS, PERMITS, AND REGULATIONS

- 12.1 Land surveys and/or base lines for locating principal structures associated with the Project together with a suitable number of bench marks near the Work site will be furnished by the Owner and shown in the Contract Documents. Utilizing information provided by the Owner, the Contractor shall develop all detail surveys needed for construction, unless specified otherwise in the Contract Documents, including but not limited to slope stakes, batter boards, stakes for pile location, working points, line elevations and cut sheets.
- 12.2 The Contractor shall assure preservation of bench marks, and other reference points. In the event of willful or careless destruction, he shall be charged with the resulting expense and shall be held responsible for any errors or mistakes resulting from such loss of bench marks or other reference points.
- 12.3 Permits and licenses of a temporary nature necessary for the prosecution of the Work shall be secured and paid for by the Contractor unless otherwise stated in the Supplemental General Conditions or Special Conditions Permits, licenses and easements for permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn and specified. If the Contractor observes that the Contract Documents are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in Section 15, Changes In Work.

13. PROTECTION OF WORK, PROPERTY AND PERSONS

- 13.1 The Contractor will be responsible for initiating, maintaining and supervising all safety precaution and programs in connection with the Work. He will take all necessary precaution for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- 13.2 The Contractor will comply with all applicable laws, ordinances, rules,

regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor will remedy all damage, injury or loss to any property caused directly or indirectly in whole or in part by the Contractor, and subcontractor or anyone for whose acts any of them be liable.

13.3 In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. He will give the Engineer prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved.

14. CONTRACTOR'S OBLIGATION FOR SUPERVISION

The Contractor will supervise and direct the Work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the Work a qualified supervisor or superintendent who shall have been designated by the Contractor as the Contractor's representative at the site. The supervisor shall have full authority to act on behalf of the Contractor and all communications given to the supervisor shall be as binding as if given to the Contractor. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

15. CHANGES IN WORK

15.1 The Owner may at any time, as the need arises, order changes within the scope of the Work without invalidating the Agreement. If such changes increase or decrease the amount due under the Contract Documents, or in the time required for performance of the Work, an equitable adjustment shall be authorized by Change Order.

15.2 The Engineer, also, may at any time, by issuing a Field Order, make changes in the details of the Work. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Engineer unless the Contractor believes that such Field Order entitles him to a change in Contract Price or Time or both, in which event he shall give the Engineer written notice thereof within seven (7) days after receipt of the ordered change. Thereafter, the

Contractor shall document the basis for the change in Contract Price or Time within thirty (30) days. The Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner.

16. CHANGES IN CONTRACT PRICE

The Contract Price may be changed only by a Change Order. The value of any Work covered by a Change Order or of any claim for increase or decrease in the Contract Price shall be negotiated and determined by one or more of the following methods in the order of precedence listed below:

- (a) An agreed lump sum
- (b) The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the Work. In addition, there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the Work to cover the cost of general overhead and profit.

17. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- 17.1 The date of beginning and the time for completion of the Contract Documents and the Work embraced shall be commenced on a date specified in the Notice to Proceed.
- 17.2 The Contractor will proceed with the Work at such a rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed by and between the Contractor and the Owner that the Contract Time for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the Work.
- 17.3 If the Contractor shall fail to complete the Work within the Contract Time, or extension of time granted by the Owner, then the Contractor will pay to the Owner the amount for liquidated damages as specified in the Bid for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.
- 17.4 The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following and the Contractor has within seven calendar days given Written Notice of such delay to the Owner or Engineer.

17.4.1 To any preference priority or allocation order duly issued by the Owner.

17.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the Contractor including but not restricted to acts of God or of the public enemy, acts of the Owner, acts of another Contractor in the performance of contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather.

17.4.3 To any delays of Subcontractors occasioned by any of the causes specified in paragraphs 17.4.1 and 17.4.2 of this article.

18. CORRECTION OF WORK

18.1 The Contractor shall promptly remove from the premises all Work rejected by the Engineer for failure to comply with the Contract Documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the Work in accordance with the Contract Documents and without expense to the Owner and shall bear the expense of making good all Work of other Contractors destroyed or damaged by such removal or replacement.

18.2 All removal and replacement Work shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected Work within ten (10) days after receipt of Written Notice, the Owner may remove such Work and store the materials at the expense of the Contractor.

19. SUBSURFACE CONDITIONS

19.1 The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Owner by Written Notice of:

19.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents: or

19.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

19.2 The Owner shall promptly investigate the conditions, and if he finds that such

conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the Work, and equitable adjustment shall be made and the Contract Documents shall be modified by a Change Order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given the required Written Notice; provided that the Owner may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

19.3 Information such as rock soundings or soil borings shown on the plans depicting subsurface conditions are thought to be representative but cannot be guaranteed accurate. It is the Contractor's responsibility to make any additional investigations necessary to ascertain or verify subsurface conditions. If subsurface conditions different from those indicated on the plans are encountered during construction, there will be no increase in Contract Price unless provided by unit prices listed on the Bid Form or by Change Order.

20. SUSPENSION OF WORK, TERMINATION AND DELAY

20.1 The Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by Written Notice to the Contractor and the Engineer. Such Written Notice shall fix the date on which Work shall be resumed. The Contractor will resume that Work on the date so fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension.

20.2 If the Contractor is adjudged as bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to subcontractors or for labor, materials, equipment, or if he disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction of the Work or if he disregards the authority of the Engineer, or if he otherwise violates any provision of the Contract Documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and his Surety a minimum of ten (10) days from delivery of a Written Notice, terminate the services of the Contractor and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish the

Work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor will pay the difference to the Owner. Such cost incurred by the Owner will be determined by the Engineer and incorporated in a Change Order.

- 20.3 Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any right of the Owner against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from compliance with the Contract Documents.
- 20.4 After ten (10) days from delivery of a Written Notice to the Contractor and the Engineer, the Owner may without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate the Contract. In such case, the Contractor shall be paid for all work executed and any expense sustained plus reasonable profit.
- 20.5 If through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days of its approval and presentation, then the Contractor may, after ten (10) days from delivery of a Written Notice to the Owner and the Engineer, terminate the Contract and recover from the Owner payment for all Work executed and all expenses sustained. In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days Written Notice to the Owner and the Engineer, stop the Work until he has been paid all amounts then due, in which event and upon resumption of the Work, Change Orders shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.
- 20.6 In the event that the Owner or Engineer determine that the Work is not being done in accordance with the Contract Documents, including, but not limited to, the fact that the Contractor does not have adequate supervision on site in accordance with Section 14 (Contractor's Obligation For Supervision) of these General Conditions, the Contractor may be ordered to stop work until he is in compliance with the Contract Documents without an increase in contract

amount or time for completion.

21. PAYMENTS TO CONTRACTOR

- 21.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the Owner, as will establish the Owner's title to the material and equipment and protect his interest therein, including applicable insurance. The Engineer will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within ten (10) days of presentation to him of an approved partial payment estimate, or at an earlier date if the Owner has received federal reimbursement funds to cover the payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate. The Owner shall retain ten (10) percent of the amount of each payment until 50% of the work is completed at which time the retainage may be reduced to 5% if satisfactory progress is being made. When the Work is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced below five (5) percent to only that amount necessary to assure completion. On completion and acceptance of a part of the Work on which the price is stated separately in the Contract Documents, payment may be made in full, including retained percentages, less authorized deductions.
- 21.2 The request for payment may also include all allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.
- 21.3 Prior to Substantial Completion, the Owner with the approval of the Engineer and with the concurrence of the Contractor, may use any completed or substantially completed portions of the Work.
- 21.4 Performance of related work on the premises by the Owner or use of partially completed portions of the Work by the Owner shall in no way be construed as relieving the Contractor of the sole responsibility for completing all Work in

accordance with the Contract Documents, for care and protection of the Work, and for restoration of any damaged Work except such as may be caused by agents or employees of the Owner.

21.5 Upon completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that the Work has been accepted by him under the conditions of the Contract Documents, the entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the Owner, shall be paid to the Contractor within thirty (30) days of completion and acceptance of the Work.

21.6 The Contractor will indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, furnishers of materials and machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the request of the Owner, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor, his Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the Contract Documents by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

22. PAYMENTS BY CONTRACTOR

The Contractor shall pay: (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered, (b) for all materials, tools, and other expendable equipment to the extent of 90% of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at the site of the Project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the Work in or on which such materials, tools and equipment are incorporated or used, and (c) to each of his Subcontractors, not later than the 15th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the Work performed by his Subcontractors to the extent of each

Subcontractor's interest therein.

23. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Owner and others relating to or arising out of this Work. Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents of the Performance Bond and Payment Bonds.

24. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

24.1 The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's execution of the Work, whether such execution be by himself or by an Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

24.1.1 Claims under workmen's compensations, disability benefit and other similar employee benefit acts;

24.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

24.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

24.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained: (a) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (b) by any other person; and

24.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

24.2 All insurance to be procured and maintained by Contractor pursuant to this Contract shall be with Best A-rated companies acceptable to Owner, and certificates evidencing such insurance acceptable to Owner shall be filed with the Owner prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies shall not be canceled unless at least fifteen (15) days prior written notice has been given to Owner. Owner shall be named as an additional insured on all said policies

of insurance.

24.3 The Contractor shall procure and maintain, at his own expense during the Contract Time, liability insurance as hereinafter specified.

24.3.1 Contractor's General Public Liability and Property Damage Insurance including vehicle coverage issued to the Contractor and protecting him from all claims for destruction of or damage to property arising out of or in connection with any operations under the Contract Documents, whether such operations be by himself or by any Subcontractor under him, or anyone directly or indirectly employed by the Contractor or by a Subcontractor under him. Insurance shall be written with a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than \$1,000,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$3,000,000 aggregate for any damages arising out of bodily injury, including death at any time resulting therefrom sustained by two or more persons in any one accident.

24.3.2 The Contractor shall acquire and maintain, Fire and Extended Coverage Insurance upon the Project to the full insurable value thereof for the benefits of the Owner, the Contractor, and the Subcontractors as their interest may appear. This provision shall in no way release the Contractor or Contractor's Surety from obligations under the Contract Documents to fully complete the Project.

24.4 The Contractor shall procure and maintain, at his own expense, during the Contract Time, in accordance with the provisions of the laws of the state in which the Work is performed, Workmen's Compensation Insurance, including occupational disease provisions, for all of his employees at the site of the Project. In case of any work sublet, the Contractor shall require such Subcontractor similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this contract at the site of the Project is not protected under Workmen's Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide adequate and suitable insurance for the protection of his employees not otherwise protected.

24.5 The Contractor shall secure, "All Risk" type Builder's Risk Insurance of Work to be performed. Unless specifically authorized by the Owner, the amount of

such insurance shall not be less than the Contract Price totaled in the Bid. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the Contract Time, and until the Work is accepted by the Owner. The policy shall name as the insured the Contractor, the Engineer, and the Owner. If the Builder's Risk Insurance excludes flood damage, the Contractor shall be required to secure the maximum amount of Federal Flood Insurance available for the Contract.

25. CONTRACT SECURITY

The Contractor shall within ten (10) days after receipt of the Notice of Award furnish the Owner with a Performance Bond and a Payment Bond in penal sums equal to the amount of the Contract Price conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions, and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the Work provided by the Contract Documents. Such Bonds shall be executed by the Contractor and all corporate bonding company licensed to transact such business in the State where the Work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these bonds shall be borne by the Contractor. If at any time a surety on any such Bond is declared bankrupt or loses its right to do business in the State in which the Work is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable Bond, (or Bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such Bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable Bond to the Owner.

26. ASSIGNMENTS

Neither the Contractor nor the Owner shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party.

27. INDEMNIFICATION

27.1 The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the

performance of the Work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury or to destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

27.2 In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Workmen's Compensation Acts, disability benefit acts or other employee benefits acts.

27.3 The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

28. SEPARATE CONTRACTS

28.1 The Owner reserves the right to let other contracts in connection with this Project. The Contractor shall afford the Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate his Work with theirs. If the proper execution or results of any part of the Contractor's Work depends upon the Work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such Work that render it unsuitable for such proper execution and results.

28.2 The Owner may perform additional Work related to the Project by himself, or he may let other contracts containing provisions similar to these. The Contractor will afford the other Contractors who are parties to such Contracts (or the Owner, if he is performing the additional Work himself) reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work, and shall properly connect and coordinate his work with theirs.

28.3 If the performance of additional Work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written

notice thereof shall be given to the Contractor prior to starting any such additional Work. If the Contractor believes that the performance of such additional Work by the Owner or others involves him in additional expense or entitles him to an extension of the Contract Time, he may make a claim therefor as provided in Sections 16 and 17.

29. SUBCONTRACTING

- 29.1 The Contractor may utilize the services of specialty Subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty Subcontractors.
- 29.2 The Contractor shall not award any Work to any Subcontractor without prior written approval of the Owner, which approval will not be given until the Contractor submits to the Owner a written statement concerning the proposed award to the Subcontractor, which statement will contain such information as the Owner may require.
- 29.3 The Contractor shall be fully responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of person directly or indirectly employed by him.
- 29.4 The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents in so far as applicable to the Work of Subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.
- 29.5 Nothing contained in this contract shall create any contractual relation between any Subcontractor and the Owner.
- 29.6 The Contractor will insert in any subcontracts the clauses contained in 29 CFR 5.5 (a) (1) through (5) and (7) and such other clauses and appropriate instructions as the Environmental Protection Agency may require, and also a clause requiring the Subcontractors to include these clauses in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

30. ENGINEER'S AUTHORITY

- 30.1 The Engineer shall act as the Owner's representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and Work performed. He shall interpret the intent of the Contract Documents in a fair and unbiased manner. The Engineer will make visits to the site and determine if the work is proceeding in accordance with the Contract Documents.
- 30.2 The Contractor will be held strictly to the intent of the Contract Documents in regard to the quality of material, workmanship and execution of the Work. Inspections may be made at the factory or fabrication plant of the source of material supply.
- 30.3 The Engineer will not be responsible for the construction means, control, techniques, sequences, procedures, or construction safety.
- 30.4 The Engineer shall promptly make decisions relative to interpretation of the Contract Documents.

31. LAND AND RIGHTS-OF-WAY

- 31.1 Prior to issuance of the Notice to Proceed, the Owner shall obtain all land and rights-of-way necessary for carrying out and for the completion of the Work to be performed pursuant to the Contract Documents, unless otherwise mutually agreed.
- 31.2 The Owner shall provide to the Contractor information which delineates and describes the lands owned and rights-of-way acquired.
- 31.3 The Contractor shall provide at his own expense without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

32. GUARANTEE

The Contractor shall guarantee all materials and equipment and work performed for a period of one (1) year after final acceptance by the Owner of all work at both plants. The Contractor warrants and guarantees during the guarantee period that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system

resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other Work that may be necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

33. ARBITRATION

33.1 All claims, disputes and other matters in question arising out of, or relating to, the Contract Documents or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 23, (Acceptance of Final Payment As Release), shall be decided by arbitration, if all parties mutually agree, in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. Any arbitration based on settlements or awards shall include the following information: (a) finding of fact, (b) allocation of award to each issue, (c) conclusion of law, (d) basis of award and rationale. The award rendered by the arbitrators shall be final, and judgement may be entered upon it in any court having jurisdiction thereof.

33.2 Notice of the demand for arbitration shall be filed in writing with the other party to the Contract Documents and with the American Arbitration Association, and a copy shall be filed with the Engineer. Demand for arbitration shall in no event be made on any claim, dispute or other matter in question which would be barred by the applicable statute of limitations.

33.3 The Contractor shall carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

34. TAXES

The Contractor shall pay all sales, consumer, use and other similar taxes required by laws of the State where the Work is performed, unless proper forms are acquired and submitted exempting the Contractor from such taxes.

35. USE OF PREMISES AND REMOVAL OF DEBRIS

35.1 The Contractor expressly undertakes at his own expense:

35.1.1 To take every precaution against injuries to persons or damage to

property;

35.1.2 To store his apparatus, materials, supplies, and equipment in such orderly fashion at the site of the Work as will not unduly interfere with the progress of his Work or the Work of any other Contractors;

35.1.3 To place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work;

35.1.4 To clean up frequently all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the Work shall present a neat, orderly and workmanlike appearance;

35.1.5 Before final payment, to remove all surplus material, falsework, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, and to put the site in a neat, orderly condition;

35.1.6 To effect all cutting, fitting or patching of his Work required to make the same to conform to the plans and specifications and, except with the consent of the Engineer, not to cut or otherwise alter the Work of any other Contractor.

36. QUANTITIES OF ESTIMATES

Whenever the estimated quantities of Work to be done and materials to be furnished on a unit price basis under this contract are shown in any of the documents including the proposal, they are given for use in comparing bids, and the right is expressly reserved, except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the Work contemplated by this contract, and such increase or diminution shall in no way vitiate this contract, nor shall any such increase or diminution give cause for claims or liability for damages.

37. CONFLICTING CONDITIONS

Any provision in any of the Contract Documents which may be in conflict or inconsistent with any of the paragraphs in these General Conditions shall be void to the extent of such conflict or inconsistency.

38. NOTICE AND SERVICE THEREOF

Any notice of any Contractor from the Owner relative to any part of this contract shall be in writing and considered delivered and the service thereof completed, when said notice is posted by certified or registered mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the Work.

39. REQUIRED PROVISIONS DEEMED INSERTED

39.1 Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party, the contract shall forthwith be physically amended to make such insertion or correction.

39.2 The Contractor agrees to abide by all local and state laws or ordinances to the extent that such requirements do not conflict with Federal Laws or regulations.

40. SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

In order to protect the lives and health of his employees under the contract, the Contractor shall comply with all pertinent provisions of the Contract Work Hours and Safety Standards Act as amended, and the Occupational Safety and Health Act of 1970 as amended, and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from Work, arising out of and in the course of employment of Work under the Contract.

The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation. He shall provide safety controls for protection of life and health of employees. The Contractor shall comply with all safety regulations of the State Department of Labor.

41. LABOR STANDARDS

The Contractor shall comply with the appropriate prevailing wage rates applicable to this project; they are contained in the Wage Rate Section of these Specifications.

42. INTEREST OF FEDERAL, STATE OR LOCAL OFFICIALS

No federal, state or local official shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

43. OTHER PROHIBITED INTEREST

No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiation, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the Project, shall become directly or indirectly interested personally in this contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the Project, shall be come directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the Project.

44. EXISTING UTILITIES

44.1 Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or by public or private utility companies.

44.2 With particular respect to existing underground utilities, the available information concerning their location has been shown on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy or adequacy of this information.

44.3 Before proceeding with the Work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the construction work. The purpose of the conference or conferences, shall be to notify said companies, agencies, or departments of the proposed construction schedule, verify the location of, and possible interference with, the existing utilities that are shown on the plans, arrange for necessary suspension of service and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the plans. The Engineer and Owner have no objection to the contractor arranging for the said utility companies, agencies, or departments to locate and

uncover their own utilities; however, the Contractor shall bear the entire responsibility for locating and avoiding or repairing damage to said existing utilities.

44.4 When the Contractor encounters any utilities not shown on the plans or in different location than shown on the plans and in conflict with the Work, he shall immediately notify the Engineer.

44.5 It is suggested that the Contractor locate all unknown metallic hazards, namely buried pipe, metals, etc by using a pipe locator. The pipe locator shall immediately precede the trench ditching and all hazard located and marked in such manner as to notify the machine operator of such hazard.

44.6 Where existing utilities or appurtenant structures, either underground or aboveground, are encountered, they shall not be displaced or molested unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. The Contractor will make all necessary utility relocations unless otherwise noted. Where new water lines, gas lines, or sewers are being installed to replace existing lines, the Contractor shall maintain the existing lines in service until new lines are in service or shall provide temporary utility service to affected customers at his expense.

44.7 It is expected that the Contractor will be diligent in his efforts and use every possible means to locate existing utilities. Any claims for unavoidable damage, based on improper or unknown locations, will be thoroughly examined in the light of the Contractor's efforts to locate the said utilities or obstructions prior to beginning construction.

45. STANDARD SPECIFICATIONS

Where standard specifications, such as those of the American Society for Testing Materials, the American Standards Association, the American Association of State Highway Officials, the Federal Aviation Agency, etc are referred to in the specifications and Contract Documents and on the plans, said references shall be construed to mean the latest amended and/or revised versions of the said standard or tentative specifications.

46. SANITARY FACILITIES

The Contractor shall furnish, install and maintain ample sanitary facilities for the workmen. As the needs arise, enclosed temporary toilets, in sufficient number, shall be placed as directed by the Engineer. Permanent toilets installed under this Contract

shall not be used during construction. Drinking water shall be provided from an approved safe source, so piped or transported as to be kept clean and fresh, and served from single service containers of satisfactory types.

47. SUPERVISION OF INSTALLATION

All major equipment and control systems shall be installed under the supervision of a qualified installation Engineer and/or representative furnished by the manufacturer of such equipment or control system.

48. AIR AND WATER POLLUTION CONTROL

The Contractor shall provide all materials, equipment, devices and work required to comply with air and water standards and to accomplish construction of the Project in a manner which will protect, enhance, and retrieve a favorable environment. The Contractor, at all times, shall observe and comply with all federal, state, possession, and local laws, codes, ordinances, and regulations governing air and water pollution control and the Contractor and his surety shall indemnify and save harmless the Owner and all his officers, agents, and servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decrees, whether by himself or his employees. The Contractor shall bear all expense of meeting and maintaining air and water standards, and any accessory features incidental to compliance without additional or direct compensation, except as otherwise specified. The Contractor shall take appropriate actions to minimize situation and soil erosion, control noise and limit odors during construction. No bypassing of wastewater will occur in conjunction with this contract without prior approval of the State Water Pollution Control Agency, and the United States Environmental Protection Agency.

49. USE OF CHEMICALS

All chemicals used during project construction or furnished for project operations, whether herbicide, pesticide, disinfectant, polymer, reactant, or of such classification, must show approval of either EPA or USDA. Use of all such chemicals shall be in conformance with instructions.

50. DAMAGE TO EXISTING LANDSCAPING, PAVEMENTS, STRUCTURES, SIDEWALKS, CURBS, ETC

The Contractor shall be responsible for replacing all lawns, trees, shrubs, fences, sidewalks, driveways, curbs, ditches, drainage structures, or other improvements both public and private which are damaged in carrying out the Work. Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental

shrubby and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing. Trees removed shall be replaced with trees of a like kind, 5'-6' in height as directed by the Engineer.

LABOR REGULATION

LR-1



Ernie Fletcher
Governor

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET

DEPARTMENT OF LABOR

OFFICE OF WORKPLACE STANDARDS

1047 US Hwy 127 S STE 4
Frankfort, Kentucky 40601
Phone: (502) 564-3070
www.kylabor.net

LaJuana S. Wilcher
Secretary

Philip J. Anderson
Commissioner

Christopher H. Smith
Executive Director

December 22, 2005

Jeff Reynolds
HMB Professional Engineers, Inc.
3 HMB Circle
Frankfort KY 40601

Re: Bracken County Water District, Delisle Curve Water Line Project & Storage Tank

Advertising Date as Shown on Notification: December 29, 2005

Dear Jeff Reynolds:

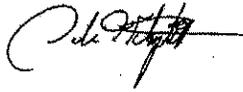
This office is in receipt of your written notification on the above project as required by KRS 337.510 (1).

I am enclosing a copy of the current prevailing wage determination number CR-1-020, dated May 18, 2005 for BRACKEN County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based upon the advertising date contained in your notification. There may be modifications to this wage determination prior to the advertising date indicated. In addition, if the contract is not awarded within 90 days of this advertising date or if the advertising date is modified, a different set of prevailing rates of wages may be applicable. It will be the responsibility of the public authority to contact this office and verify the correct schedule of the prevailing rates of wages for use on the project. Your project number is as follows:
012-H-00019-05-1, Heavy/Highway

Sincerely,

LR-2



John Fitzpatrick
Prevailing Wage Specialist
KENTUCKY DEPARTMENT OF LABOR
PREVAILING WAGE DETERMINATION
CURRENT REVISION
LOCALITY NO. 20

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

Determination No. CR-1-20 2005

Date of Determination: May 18, 2005

Project No. 012-H-00019-05-1 Type: ___ Bldg <u>XXX</u> HH
--

This schedule of the prevailing rate of wages for Bracken, Carter, Greenup, Lewis, Mason & Robertson Counties has been determined in accordance with the provisions of KRS 337.505 to 337.550. This determination shall be referred to as Prevailing Wage Determination No. CR-1-20 2005.

Apprentices shall be permitted to work as such subject to Administrative Regulations adopted by the Executive Director of Workplace Standards. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated BASE RATE for all hours worked in excess of eight (8) per day, and/or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one calendar day, but not more than ten (10) hours worked in any one calendar day, if such written agreement is prior to the over eight (8) hours in a calendar day actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked.

Fringe benefit amounts are applicable for all hours worked except when otherwise noted. Welders will receive rate for craft in which welding is incidental.

NOTE: The type of construction shall be determined by applying the following definitions:

BUILDING CONSTRUCTION

Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

HIGHWAY CONSTRUCTION

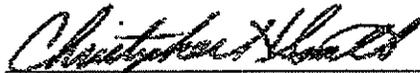
Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.



Philip J. Anderson, Commissioner
Kentucky Department of Labor



Christopher H. Smith, Executive Director
Office of Workplace Standards
Kentucky Department of Labor

Ratified September 28, 2005

Determination No. CR-1-20 2005

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, MASON & ROBERTSON COUNTIES:

ASBESTOS/INSULATION WORKERS:

Asbestos/Insulation Workers: (Includes application of all insulating materials, protective coverings, coating and finishing to all types of mechanical systems):

BASE RATE \$22.72
FRINGE BENEFITS 9.75

Hazardous Material Handlers: (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems):

BASE RATE \$19.60
FRINGE BENEFITS 7.00

CARTER, GREENUP & LEWIS COUNTIES:

ASBESTOS/INSULATION WORKERS:

Asbestos/Insulation Workers: (Includes application of all insulating materials, protective coverings, coating and finishing to all types of mechanical systems):

BASE RATE \$26.10
FRINGE BENEFITS 11.74

Hazardous Material Handlers: (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems):

BASE RATE \$18.25
FRINGE BENEFITS 6.18

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

BOILERMAKERS:

BASE RATE \$31.29
FRINGE BENEFITS 15.67

BRACKEN, MASON & ROBERTSON COUNTIES:

BRICKLAYERS:

Bricklayers, Caulkers & Cleaners:

BASE RATE \$24.41
FRINGE BENEFITS 8.14

Refractory:

BUILDING

BASE RATE \$24.91
FRINGE BENEFITS 8.14

Marble Setters, Terrazzo Workers, & Tile Setters:

BUILDING

BASE RATE \$25.92

FRINGE BENEFITS 7.34

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, LEWIS & MASON COUNTIES:

MARBLE FINISHERS:

Finishers:

BUILDING

BASE RATE \$21.48

FRINGE BENEFITS 7.34

Marble Sanders, Polishers, Waxers & Sawyers:

BUILDING

BASE RATE \$21.55

FRINGE BENEFITS 7.34

Terrazzo Base Grinders (While operating base grinding machine):

BUILDING

BASE RATE \$21.90

FRINGE BENEFITS 7.34

CARTER, GREENUP & LEWIS COUNTIES:

BRICKLAYERS:

Bricklayers, Caulkers, Cleaners, Marble Setters, Pointers, Stonemasons, Terrazzo Workers, & Tile Setters:

BASE RATE \$24.46

FRINGE BENEFITS 9.93

CARTER & GREENUP COUNTIES:

MARBLE FINISHERS:

Marble, Terrazzo & Tile Finishers:

BUILDING

BASE RATE \$19.09

FRINGE BENEFITS 4.96

Terrazzo Base Grinders:

BUILDING

BASE RATE \$19.51

FRINGE BENEFITS 4.96

Marble Sanders & Polishers:

BUILDING

BASE RATE \$19.16

FRINGE BENEFITS 4.96

BRACKEN COUNTY:

CARPENTERS:

Carpenters & Piledrivermen: (Does not include Walls/Ceiling Work):

BUILDING

BASE RATE \$19.22

FRINGE BENEFITS 4.77

Carpenters & Lathers: (Walls & Ceiling work only):
BUILDING

BASE RATE \$18.99
FRINGE BENEFITS 4.98

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN COUNTY:

CARPENTERS (Continued):

Carpenters:	HEAVY & HIGHWAY	BASE RATE	\$22.85
		FRINGE BENEFITS	7.23
Piledrivermen:	HEAVY & HIGHWAY	BASE RATE	\$23.10
		FRINGE BENEFITS	7.23
Divers:	HEAVY & HIGHWAY	BASE RATE	\$34.65
		FRINGE BENEFITS	7.23

CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

CARPENTERS:

Carpenters: (Soft Floor Layers)	BUILDING	BASE RATE	\$23.92
		FRINGE BENEFITS	9.44
Carpenters	HEAVY & HIGHWAY	BASE RATE	\$22.85
		FRINGE BENEFITS	7.23
Piledrivermen:	BUILDING	BASE RATE	\$24.32
		FRINGE BENEFITS	9.44
	HEAVY & HIGHWAY	BASE RATE	\$23.10
		FRINGE BENEFITS	7.23
Divers:	HEAVY & HIGHWAY	BASE RATE	\$34.65
		FRINGE BENEFITS	7.23

BRACKEN & ROBERTSON COUNTIES:

CEMENT MASON:	BUILDING	BASE RATE	\$20.70
		FRINGE BENEFITS	7.05

CARTER, GREENUP, LEWIS & MASON COUNTIES:

CEMENT MASON; PLASTERER:	BUILDING	BASE RATE	\$25.64
--------------------------	----------	-----------	---------

FRINGE BENEFITS 9.75

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN COUNTY:

ELECTRICIANS:

Electricians:		BASE RATE	\$24.24
		FRINGE BENEFITS	9.34

SOUND COMMUNICATIONS:

Installer:		BASE RATE	\$18.00
		FRINGE BENEFITS	3.475

Cable Puller:		BASE RATE	\$ 9.00
		FRINGE BENEFITS	2.64

Line Construction:

Linemen:	BUILDING	BASE RATE	\$24.10
		FRINGE BENEFITS	6.66

Equipment Operator:	BUILDING	BASE RATE	\$21.69
		FRINGE BENEFITS	6.21

Groundmen:	BUILDING	BASE RATE	\$15.67
		FRINGE BENEFITS	5.10

CARTER COUNTY:

ELECTRICIANS:

Electricians:		BASE RATE	\$23.11
		FRINGE BENEFITS	11.04

Cable Splicers:		BASE RATE	\$24.27
		FRINGE BENEFITS	11.08

CARTER, GREENUP & LEWIS COUNTIES:

LINE CONSTRUCTION:

Linemen	BUILDING	BASE RATE	\$23.51
		FRINGE BENEFITS	11.76

Cable Splicers	BUILDING	BASE RATE	\$26.21
		FRINGE BENEFITS	11.83

Equipment Operators:	BUILDING	BASE RATE	\$18.81
		FRINGE BENEFITS	11.61

Groundman:	BUILDING	BASE RATE	\$15.28
		FRINGE BENEFITS	11.50

CLASSIFICATIONS **RATE AND FRINGE BENEFITS**

ROBERTSON COUNTY:

ELECTRICIANS:

Electricians:		BASE RATE	\$25.75
		FRINGE BENEFITS	9.52

LINE CONSTRUCTION:

Cable Splicer:		BASE RATE	\$26.75
		FRINGE BENEFITS	7.90

Equipment Operator A: John Henry Rock Drill, D6 (or equivalent) and above, Trackhoe Digger, Cranes (greater than 25 tons and less than 45 tons):

BASE RATE	\$23.63
FRINGE BENEFITS	7.41

Equipment Operator B: Cranes (6-25 tons), Backhoes, Road Tractor, Dozer up to D5, Pressure Digger-Wheeled or Tracked, all Tension Wire Stringing Equipment:

BASE RATE	\$21.00
FRINGE BENEFITS	7.16

Equipment Operator C: Trencher, Vibratory Compactor, GroundRod Driver, Boom Truck (6 ton or below), Skid Steer Loaders:

BASE RATE	\$17.06
FRINGE BENEFITS	6.39

Groundman:		BASE RATE	\$19.69
		FRINGE BENEFITS	6.80

Lineman and Technician:		BASE RATE	\$26.25
		FRINGE BENEFITS	7.82

Cranes 45 tons or larger paid 100% of journeyman lineman's rate.

GREENUP, LEWIS & MASON COUNTIES:

ELECTRICIANS:

Electricians:		BASE RATE	\$25.75
		FRINGE BENEFITS	9.52

SOUND & COMMUNICATIONS:

Installer:		BASE RATE	\$18.95
------------	--	-----------	---------

FRINGE BENEFITS 6.69

Cable Puller:

BASE RATE \$10.01

FRINGE BENEFITS 6.21

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

ELEVATOR MECHANICS:

BASE RATE \$26.255

FRINGE BENEFITS 7.455

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

GLAZIERS:

BUILDING

BASE RATE \$24.81

FRINGE BENEFITS 4.10

BRACKEN, MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Morganburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington) & ROBERTSON COUNTIES:

IRONWORKERS:

Structural, & Ornamental:

BASE RATE \$24.00

FRINGE BENEFITS 11.58

Fence Erector:

BASE RATE \$22.05

FRINGE BENEFITS 11.58

Reinforcing:

Beyond 30-mile radius of Hamilton County, OH Courthouse

BASE RATE \$22.96

FRINGE BENEFITS 10.47

Up to and including 30-mile radius of Hamilton County, OH Courthouse

BASE RATE \$22.71

FRINGE BENEFITS 10.47

CARTER, GREENUP, LEWIS & MASON (Eastern third, including the Townships of Helena, Marshall, Orangeburg, Plumville & Springdale) COUNTIES:

IRONWORKERS:

Up to 10-mile radius of Union Hall, Ashland Kentucky:

BASE RATE \$25.67

FRINGE BENEFITS 11.57

10 to 50 mile radius of Union Hall, Ashland Kentucky:

BASE RATE \$26.07

FRINGE BENEFITS 11.57

50 mile radius & over of Union Hall, Ashland Kentucky:

BASE RATE \$28.07
FRINGE BENEFITS 11.57

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN & MASON COUNTIES:

LABORERS/BUILDING:

GROUP 1:

Asbestos Abatement, Carpenter Tender, General, Concrete Pouring & Curing, Concrete Form Stripping & Wrecking, Hand Digging & Backfilling of Ditches, Clearing of Right-of-ways & Building Sites, Wood Sheeting & Shoring, Signalperson for Concrete Bucket, General Cleaning, Toxic Waste Removal, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level D:

BUILDING BASE RATE \$17.33
FRINGE BENEFITS 6.58

GROUP 2:

Air Tool Operator, Air Track Drill, Asphalt Raker, Tamper, Batch Plant & Scale Man, Chain Saw, Concrete Saw, Electric Hand Grinder, Electric Bush & Chipping Hammer, Flagperson, Forklift Operator, Form Setter (Street or Highway), Gunnite, Hand Spiker, Introflax Burning Rod, Joint Maker, Mason Tender, Pipelayer, Plasterer Tender, Power Driven Georgia Buggy, Power Posthole Digger, Railroad, Sandblaster, Scow Man & Deck Hand, Signalperson, Sweeper & Cleaner Machine, Vibrator Operator, Walk Behind Trenching Machine, Mortar Mixer Machine, Water Pumpman, Metal Form Setter, Heater, Mesh Handler on walkways, streets & roadway (Outside Buildings), & Environmental Laborers – Nuclear, Radiation, Toxic & Hazardous Waste – Level C:

BUILDING BASE RATE \$17.73
FRINGE BENEFITS 6.58

GROUP 3:

Gunnite Nozzleman & Gunnite Nozzle Machine Operator, Sand Blaster Nozzleman, Concrete or Grout Pumpman, & Plaster Pumpman:

BUILDING BASE RATE \$17.93
FRINGE BENEFITS 6.58

GROUP 4:

Powderman & Blaster, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level B:

BUILDING BASE RATE \$18.03
FRINGE BENEFITS 6.58

GROUP 5:

Caisson Hole (6 ft. & over – Pressure & Free Air including Tools), Construction Specialist, Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level A:

BUILDING BASE RATE \$18.53
FRINGE BENEFITS 6.58

GROUP 6:

Tunnel Man & Tunnel Sand Miner, Cofferdam (Pressure & Free Air), & Sand Hog or Mucker (Pressure or Free Air), & Sand Hog or Mucker (Pressure or Free Air):

BUILDING	BASE RATE	\$18.83
	FRINGE BENEFITS	6.58

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

ROBERTSON COUNTY:

LABORERS/BUILDING:

GROUP 1:

Asbestos Abatement, Carpenter Tender, General, Concrete Pouring & Curing, Concrete Form Stripping & Wrecking, Hand Digging & Backfilling of Ditches, Clearing of Right-of-ways & Building Sites, Wood Sheeting & Shoring, Signalperson for Concrete Bucket, General Cleaning, Toxic Waste Removal, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level D:

BUILDING	BASE RATE	\$15.00
	FRINGE BENEFITS	6.56

GROUP 2:

Air Tool Operator, Air Track Drill, Asphalt Raker, Tamper, Batch Plant & Scale Man, Chain Saw, Concrete Saw, Electric Hand Grinder, Electric Bush & Chipping Hammer, Flagperson, Forklift Operator, Form Setter (Street or Highway), Gunnite, Hand Spiker, Introlax Burning Rod, Joint Maker, Mason Tender, Pipelayer, Plasterer Tender, Power Driven Georgia Buggy, Power Posthole Digger, Railroad, Sandblaster, Scow Man & Deck Hand, Signalperson, Sweeper & Cleaner Machine, Vibrator Operator, Walk Behind Trenching Machine, Mortar Mixer Machine, Water Pumpman, Metal Form Setter, Heater, Mesh Handler on walkways, streets & roadway (Outside Buildings), & Environmental Laborers – Nuclear, Radiation, Toxic & Hazardous Waste – Level C:

BUILDING	BASE RATE	\$15.40
	FRINGE BENEFITS	6.56

GROUP 3:

Gunnite Nozzleman & Gunnite Nozzle Machine Operator, Sand Blaster Nozzleman, Concrete or Grout Pumpman, & Plaster Pumpman:

BUILDING	BASE RATE	\$15.60
	FRINGE BENEFITS	6.56

GROUP 4:

Powderman & Blaster, & Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level B:

BUILDING	BASE RATE	\$15.70
	FRINGE BENEFITS	6.56

GROUP 5:

Caisson Hole (6 ft. & over – Pressure & Free Air including Tools), Construction Specialist, Environmental Laborer – Nuclear, Radiation, Toxic & Hazardous Waste – Level A:

BUILDING	BASE RATE	\$16.20
	FRINGE BENEFITS	6.56

GROUP 6:

Tunnel Man & Tunnel Sand Miner, Cofferdam (Pressure & Free Air), & Sand Hog or Mucker (Pressure or Free Air), & Sand Hog or Mucker (Pressure or Free Air):

BUILDING	BASE RATE	\$16.50
	FRINGE BENEFITS	6.56

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

CARTER, GREENUP & LEWIS COUNTIES:

LABORERS/BUILDING:

GROUP 1:

General, Carpenter Tender, Cement Finisher Tender, Concrete Man, Wrecker, Handler of Empty Oxygen & Acetylene Bottles, & Environmental Laborer:

BUILDING	BASE RATE	\$21.80
	FRINGE BENEFITS	8.58

GROUP 2:

Deck & Scow Man:

BUILDING	BASE RATE	\$21.90
	FRINGE BENEFITS	8.58

GROUP 3:

Hod Carrier, Mortar Man, & Plasterer Tender:

BUILDING	BASE RATE	\$21.95
	FRINGE BENEFITS	8.58

GROUP 4:

Wrapping, Heating & Applying Hot & Cold Tar on all Pipes, Applying Tape on Pipes, & Operation of Tester:

BUILDING	BASE RATE	\$21.97
	FRINGE BENEFITS	8.58

GROUP 5:

Jackhammer, Power Tools (Electrical, Gas, or Air Power), Burning Torch, Wagon Drill Operator, Tile Layer, Handling of Creosote Material, Signalperson, & Asphalt Raker:

BUILDING	BASE RATE	\$22.05
	FRINGE BENEFITS	8.58

GROUP 6:

Rock & Powder Man:

BUILDING	BASE RATE	\$22.30
	FRINGE BENEFITS	8.58

GROUP 7:

Sand Hog & Mucker:

BUILDING	BASE RATE	\$22.50
	FRINGE BENEFITS	8.58

GROUP 8:

Caisson Worker:

BUILDING	BASE RATE	\$23.00
	FRINGE BENEFITS	8.58

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

LABORERS HEAVY/HIGHWAY:

GROUP 1:

Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental – Nuclear, Radiation, Toxic & Hazardous Waste – Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; & Wrecking of Concrete Form & General Cleanup:

HEAVY & HIGHWAY BASE RATE \$17.43
FRINGE BENEFITS 8.38

GROUP 2:

Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Burner & Welder; Bushhammer; Chain Saw Operator; Hand Held or Walk Behind Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental – Nuclear, Radiation, Toxic & Hazardous Waste – Level C; Forklift Operator for Masonry; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; & Wagon Driller:

HEAVY & HIGHWAY BASE RATE \$17.68
FRINGE BENEFITS 8.38

GROUP 3:

Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditch; Screw Operator; Tunnel (Free air); & Water Blaster:

HEAVY & HIGHWAY BASE RATE \$17.73
FRINGE BENEFITS 8.38

GROUP 4:

Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Driller (all types); Powderman & Blaster; Troxler & Concrete Tester if Laborer is Utilized:

HEAVY & HIGHWAY BASE RATE \$18.33
FRINGE BENEFITS 8.38

BRACKEN COUNTY:

MILLWRIGHTS:

BASE RATE \$21.90
FRINGE BENEFITS 7.92

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

MILLWRIGHTS:

BASE RATE \$27.33
FRINGE BENEFITS 9.99

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

OPERATING ENGINEERS: BUILDING:

Auto Patrol, Batch Plant, Bituminous Paver, Cableway, Central Compressor Plant, Clamshell, Concrete Mixer (21 cu. ft. or over), Concrete Pump, Crane, Crusher Plant, Derrick, Derrick Boat, Ditching & Trenching Machine, Dragline, Dredge, Dredge Engineer, Elevating Grader and all types of Loaders, Hoe Type Machine, Hoist (1 drum when used for stack or chimney construction or repair), Hoisting Engine (2 or more Drums), Locomotive, Motor Scrapper, Carry-All Scoop, Bulldozer, Mechanic, Orangepeel Bucket, Piledriver, Power Blade, Motor Grader, Roller (Bituminous), Scarifier, Shovel, Tractor Shovel, Truck Crane, Winch Truck, Push Dozer, Highlift, Forklift (Regardless of lift height & except when used for masonry construction), Boom Cat, Core Drill, Hopto, Tow or Push Boat, A-Frame Winch Truck, Concrete Paver, Gradeall, Hoist, Hyster, Pumpcrete, Ross Carrier, Boom, Tail Boom, Rotary Drill, Hydro Hammer, Mucking Machine, Rock Spreader (Attached to Equipment), Scoopmobile, KeCal Loader, Tower Crane (French, German & Other Types), Hydrocrane, Backfiller, Gurry, Subgrader, Tunnel Mining Machine, including Moles, Shield or similar types of Tunnel Mining Equipment:

BUILDING *BASE RATE \$22.89
FRINGE BENEFITS 9.65

Cable Crane (50 tons and over), Hydraulic Crane (100 tons and over):

BUILDING *BASE RATE \$23.50
FRINGE BENEFITS 9.65

***Crane with boom 150 feet and over, including jib, shall received \$.50 above Base Rate, Cranes with CCO required shall receive \$.10 above Base Rate.**

Air Compressor (Over 900 cu. ft. per min.), Bituminous Mixer, Joint Sealing Machine, Concrete Mixer (under 21 cu. ft.), Form Grader, Roller (Rock), Tractor (50 h.p. and Over), Bull Float, Finish Machine, Outboard Motor Boat, Flexplane, Fireperson, Boom Type Tamping Machine, Truck Crane Oiler, Greaser on Grease Facilities servicing heavy equipment, Switchman or Brakeman, Whirley Oiler, Self-propelled Compactor, Tractair & Road Widening Trencher & Farm Tractor with attachments, except Backhoe, Highlift & Endloader, Elevator (When used for hoisting any building materials), Hoisting Engine (1 Drum or Buck Hoist), Forklift (When used for masonry construction, firebrick masonry excluded), Well Points, Grout Pump, Throttle-Valve Man, Tugger, & Electric Vibrator Compactor:

BUILDING BASE RATE \$19.56
FRINGE BENEFITS 9.65

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

OPERATING ENGINEERS: BUILDING: (Continued)

Bituminous Distributor, Cement Gun, Conveyor, Mud Jack, Paving Joint Machine, Roller (Earth), Tamping Machine, Tractor (Under 50 H.P.), Vibrator, Oiler, Concrete Saw, Burlap & Curing Machine, Hydro Seeder, Power Form Handling Equipment, Deckhand Steersman, & Hydraulic Post Driver:

BUILDING	BASE RATE	\$18.61
	FRINGE BENEFITS	9.65

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

OPERATING ENGINEERS: HEAVY HIGHWAY:

CLASS A:

A-Frame Winch Truck; Auto Patrol; Backfiller; Batchter Plant; Bituminous Paver; Bituminous Transfer Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-all Scoop; Carry Deck Crane; Central Compressor Plant; Clamshell; Concrete Mixer (21 cu. ft. or Over); Concrete Paver; Truck-Mounted Concrete Pump; Core Drill; Crane; Crusher Plant; Derrick; Derrick Boat; Ditching & Trenching Machine; Dragline; Dredge Operator; Dredge Engineer; Elevating Grader & Loaders; Grade-All; Gurries; Heavy Equipment Robotics Operator/Mechanic; High Lift; Hoe-Type Machine; Hoist (Two or More Drums); Hoisting Engine (Two or More Drums); Horizontal Directional Drill Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau; Locomotive; Mechanic; Mechanically Operated Laser Screed; Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel Bucket; Piledriver; Power Blade; Pumpcrete; Push Dozer; Rock Spreader, attached to equipment; Rotary Drill; Roller (Bituminous); Scarifier; Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Telescoping Type Forklift; Tow or Push Boat; Tower Crane (French, German & other types); Tractor Shovel; Truck Crane; Tunnel Mining Machines, including Moles, Shields or similar types of Tunnel Mining Equipment:

HEAVY & HIGHWAY	*BASE RATE	\$22.15
	FRINGE BENEFITS	10.40

CLASS B:

Air Compressor (Over 900 cu. ft. per min.); Bituminous Mixer; Boom Type Tamping Machine; Bull Float; Concrete Mixer (Under 21 cu. ft); Dredge Engineer; Electric Vibrator; Compactor/Self-Propelled Compactor; Elevator (One Drum or Buck Hoist); Elevator (when used to Hoist Building Material); Finish Machine; Firemen & Hoist (One Drum); Flexplane; Forklift (Regardless of Lift Height); Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Concrete Pump; Switchman or Brakeman; Throttle Valve Person; Tractair & Road Widening Trencher; Tractor (50 HP or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler:

HEAVY & HIGHWAY	*BASE RATE	\$19.73
	FRINGE BENEFITS	10.40

CLASS B2:

Greaser on Grease Facilities servicing Heavy Equipment:

HEAVY & HIGHWAY	*BASE RATE	\$20.11
	FRINGE BENEFITS	10.40

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

OPERATING ENGINEERS: (Continued)

HEAVY HIGHWAY:

CLASS C:

Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steersman; Tamping Machine; Tractor (Under 50 HP); & Vibrator:

HEAVY & HIGHWAY	*BASE RATE	\$19.47
	FRINGE BENEFITS	10.40

*Cranes with booms 150 ft. & over (including jib) \$1.00 premium. Employees assigned to work below ground level are to be paid 10% above basic wage rate. This does not apply to open cut work.

BRACKEN, MASON & ROBERTSON COUNTIES:**PAINTERS: BUILDING ONLY:**

Brush, Roller, Paperhanging & Taping:

BUILDING	BASE RATE	\$21.30
	FRINGE BENEFITS	5.90

Spray:

BUILDING	BASE RATE	\$21.80
	FRINGE BENEFITS	5.90

Sandblasting, Waterblasting, & Hopper Tender:

BUILDING	BASE RATE	\$22.05
	FRINGE BENEFITS	5.90

Hazardous Work, High Work, Elevated Tanks 40 Feet or Above, & Lead Abatement Projects:

BUILDING	BASE RATE	\$22.30
	FRINGE BENEFITS	5.90

Sandblasting, Hopper Tender & Waterblasting Under Hazardous Conditions:

BUILDING	BASE RATE	\$23.05
	FRINGE BENEFITS	5.90

HEAVY/HIGHWAY ONLY

Elevated Tanks:

HEAVY & HIGHWAY	BASE RATE	\$22.30
	FRINGE BENEFITS	5.90

BRIDGES – GUARDRAILS – LIGHTPOLES – STRIPING:

Bridge/Equipment Tender and/or Containment Builder:

HEAVY & HIGHWAY	BASE RATE	\$18.90
-----------------	-----------	---------

FRINGE BENEFITS 5.90

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, MASON & ROBERTSON COUNTIES:

PAINTERS HEAVY/HIGHWAY ONLY: (Continued)

Brush & Roller: HEAVY & HIGHWAY BASE RATE \$21.30
FRINGE BENEFITS 5.90

Spray: HEAVY & HIGHWAY BASE RATE \$21.80
FRINGE BENEFITS 5.90

Sandblasting & Hopper Tender, Water Blasting:
HEAVY & HIGHWAY BASE RATE \$22.05
FRINGE BENEFITS 5.90

Bridges when highest point of clearance is 60 feet or more, & Lead Abatement Projects:
HEAVY & HIGHWAY BASE RATE \$22.30
FRINGE BENEFITS 5.90

Sandblasting, Hopper Tender, Waterblasting (Bridges when highest point of clearance is 60 feet or more):
HEAVY & HIGHWAY BASE RATE \$23.05
FRINGE BENEFITS 5.90

CARTER, GREENUP & LEWIS COUNTIES:

PAINTERS: BUILDING BASE RATE \$20.47
FRINGE BENEFITS 9.90

Bridges: HEAVY & HIGHWAY BASE RATE \$24.61
FRINGE BENEFITS 10.40

All Other Work: HEAVY & HIGHWAY BASE RATE \$20.47
FRINGE BENEFITS 9.90

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES:

PAINTERS:

Sign Painter & Erector: BUILDING BASE RATE \$17.57
FRINGE BENEFITS 4.55

FRINGE BENEFITS 11.00

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

BRACKEN, MASON & ROBERTSON COUNTIES:

TRUCK DRIVERS/BUILDING:

3 Tons & Under, Greaser, Tire Changer, & Mechanic Tender:

BUILDING	BASE RATE	\$17.52
	FRINGE BENEFITS	8.04

Over 3 Tons, Semi-Trailer or Pole Trailer, Dump Tandem Axles, Farm Tractor (When used to pull building material & equipment):

BUILDING	BASE RATE	\$17.63
	FRINGE BENEFITS	8.04

Concrete Mixer (Hauling on jobsites), & Truck Mechanic:

BUILDING	BASE RATE	\$17.70
	FRINGE BENEFITS	8.04

Euclid's & Other Heavy Moving Equipment, Lowboy, Winch, A-Frame & Monorail Truck (To transport building materials):

BUILDING	BASE RATE	\$17.80
	FRINGE BENEFITS	8.04

Building Truck Drivers on hazardous or toxic waste sites, add \$4.00 to base rate.

CARTER, GREENUP & LEWIS COUNTIES:

TRUCK DRIVERS/BUILDING:

Pickup, Station Wagon, Panel, Flatboy Material Truck (Straight job), Dump (Up to 5 cu. yds.):

BUILDING	BASE RATE	\$24.59
	FRINGE BENEFITS	9.81

Tank (Straight), Dump (5 cu. yds. & over), Agitator or Mixer (Up to 5 cu. yds.), & Flat Bed Tandem:

BUILDING	BASE RATE	\$24.97
	FRINGE BENEFITS	9.81

Winch, Fork, Distributor (Front End and Back End), Truck Crane, & Monorail:

BUILDING	BASE RATE	\$25.78
	FRINGE BENEFITS	11.30

Agitator or Mixer (5 cu. yds. & Over):

BUILDING	BASE RATE	\$25.20
	FRINGE BENEFITS	9.81

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

TRUCK DRIVERS/BUILDING: (Continued)

CARTER, GREENUP & LEWIS COUNTIES:

Mechanic, Tri-Axle Dump, Hydraulic Lift Tailgate, Truck & Farm-type Tractor, End Dumpster, Turnarocker, Ross Carrier, Athey Wagon, Semi-dump, Semi-trailer, Semi-tank, & Lowboy Trailer:

BUILDING	BASE RATE	\$25.61
	FRINGE BENEFITS	9.81

Master Mechanic:	BUILDING	BASE RATE	\$25.97
		FRINGE BENEFITS	9.81

TRUCK DRIVERS HEAVY/HIGHWAY

BRACKEN, CARTER, GREENUP, LEWIS, MASON & ROBERTSON COUNTIES

Mobile Batch Truck Tender:	HEAVY & HIGHWAY	BASE RATE	\$16.57
		FRINGE BENEFITS	7.34

Greaser, Tire Changer, & Mechanic Tender:	HEAVY & HIGHWAY	BASE RATE	\$16.68
		FRINGE BENEFITS	7.34

Single Axle Dump & Flatbed; Semi-Trailer or Pole Trailer when used to pull building materials & equipment; Tandem Axle Dump; Distributor; Mixer & Truck Mechanic:

HEAVY & HIGHWAY	BASE RATE	\$16.86
	FRINGE BENEFITS	7.34

Euclid, Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat Truck, 5 Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Forklift when used to transport building materials; & Pavement Breaker:

HEAVY & HIGHWAY	BASE RATE	\$16.96
	FRINGE BENEFITS	7.34

END OF DOCUMENT CR-1-20 2005



PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called PRINCIPAL and
(Corporation, Partnership, or Individual)

(Name of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, and unto all persons, firms and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns in the total aggregate penal sum of _____ Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the _____ day of _____, 20 __, a copy of which is hereto attached and made a part hereof for the construction of: _____

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in prosecution of the WORK provided for in such contract, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall

be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the SPECIFICATIONS.

PROVIDE FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL shall have given written notice to any two of the following: the PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (B) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, is being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

WITNESS WHEREOF, this instrument is executed in _____ counterparts, each of which
Number

shall be deemed an original, this the _____ day of _____.

ATTEST:

(Principal) Secretary

(SEAL)

Principal

By _____

(Address)

Witness as to Principal

(Address)

Surety

ATTEST:

Witness as to Surety

(Address)

By _____

Attorney-in-Fact

(Address)

NOTE: Date of BOND must not be prior to date of CONTRACT.

If CONTRACTOR is partnership, all partners should execute BOND. IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the total aggregate penal sum of _____
_____ Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the ____ day of _____ 20 ____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the one year guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract shall include any alteration, addition, extension, or modification of any character whatsoever.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one
Number

of which shall be deemed an original, this the _____ day of _____.

ATTEST:

(Principal) Secretary

(SEAL)

Principal

By _____(s)

(Witness as to Principal)

(Address)

(Address)

Surety

ATTEST:

Witness to Surety

By _____
Attorney-in-Fact

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

CONTRACT AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 20__

by and between _____
(Owner)

acting through its _____ hereinafter
called (Mayor, Utility Commission, Chairmen)

the OWNER and _____ doing business as
(Contractor)

_____ of the city of _____
(an individual) (partnership) (a corporation)

_____, County, State of _____

hereinafter called the CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

The CONTRACTOR will commence and complete the construction of

The CONTRACTOR will furnish all of the materials, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein.

The CONTRACTOR will commence work under this contract on or before the date to be specified by the Owner, in a written "Notice to Proceed" and will fully complete the project within _____ consecutive calendar days thereafter. The CONTRACTOR further agrees to pay as liquidated damages, the sum of \$_____ For each consecutive calendar day that the work remains uncomplete after the expiration date of this contract, as modified by Change Order.

The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS for the sum of \$_____, or as shown in the Bid Schedule, Pages BS _____ thru BS _____.

The term "CONTRACT DOCUMENTS" means and includes the following:
SPECIFICATIONS prepared or issued by HMB Professional Engineers, Inc.

<u>TITLE</u>	<u>DESIGNATION</u>
Advertisement for Bids	<u>AD</u>
Instructions to Bidders	<u>IB</u>
General Conditions	<u>GC</u>
Labor Regulations	<u>LR</u>
Performance and Payment Bond	<u>PB</u>
Contract Agreement	<u>CON</u>
Notice of Award	<u>NA</u>
Notice to Proceed	<u>NP</u>
Change Order Format	<u>CO</u>
Special Conditions	<u>SC</u>
Technical Specifications	<u>TS</u>
Bid Schedule	<u>BS</u>

DRAWINGS prepared by HMB Professional Engineers, Inc.
numbered _____ through _____ and dated _____.

The following ADDENDA are included as part of this Contract:

ADDENDUM NO. _____

DATE

The OWNER shall make progress payments as the work is completed, in accordance with the appropriate Articles of the General Conditions.

Final payment shall be due thirty (30) days after completion and acceptance of the work.

Before issuance of final certificate, the Contractor shall submit evidence satisfactory to the Owner that all payrolls, material bills, and other indebtedness connected with the work have been paid.

If, after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and the Engineer so certifies, the Owner shall, upon certificate of the Engineer and without terminating the contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in _____ copies each of which shall be deemed an original on the date first above written.

This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

CONTRACTOR

ATTEST:

Title
(SEAL)

By _____
Title

ATTEST:

OWNER

Title

By _____
Title

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

NOTICE OF AWARD

TO: _____

PROJECT Description _____

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____ 20 _____, and Instructions to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____, in accordance with the Bid Schedule.

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Contractor's Performance Bond and Payment Bond within ten calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said bonds within ten days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 20 _____.

Owner
By _____
Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by

_____ this the _____ of _____
_____, 20 _____.

Contractor

Title

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

NOTICE TO PROCEED

TO _____

DATE: _____
PROJECT: _____

You are hereby notified to commence work in accordance with the Agreement dated _____, 20 _____, on or before _____, 20 _____, and you are to complete the WORK within _____ consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 20 _____.

OWNER
By _____
Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by _____, this the _____ day of _____, 20 _____.

By _____
Title _____

CONTRACT CHANGE ORDER

	ORDER NO.
	DATE
	STATE
CONTRACT FOR	COUNTY

OWNER

To: _____
 (Contractor)

You are hereby requested to comply with the following changes from the contract plans and specifications:

Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
	\$ _____	\$ _____
TOTALS	\$ _____	\$ _____
NET CHANGE IN CONTRACT PRICE	\$ _____	\$ _____

JUSTIFICATION:

The Original amount of the Contract is: _____ Dollars (\$ _____).

The amount of the current Contract including previous Change Orders: _____ Dollars (\$ _____).

The amount of the Contract will be (Increased Decreased) by this Change Order the sum of _____ Dollars (\$ _____).

The Contract Total including this and previous Change Orders will be: _____ Dollars (\$ _____).

The Contract period provided for completion will be increased: _____ Days

This document will become a supplement to the contract and all provisions will apply hereto.

Requested _____ (Owner) _____ (Date)

Recommended _____ (Owner's Architect/Engineer) _____ (Date)

Accepted _____ (Contractor) _____ (Date)

Approved By _____ (Name and Title) _____ (Date)

This information will be used as a record of any changes to the original construction contract.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

SPECIAL CONDITIONS

1. PROJECT FUNDING

Contractors bidding the project should be aware that funding is provided by a KIA Tobacco Grant and KRWA Loan.

2. PROJECT INSPECTION

The Inspection services shall be provided by the Engineer. The Inspector shall be on the project at all times; however, due to meetings, etc. there may be times when he is not with the crew. Therefore, the Contractor shall not backfill any water main and/or appurtenances until the Inspector has seen it.

3. UNCLASSIFIED EXCAVATION

All excavation is unclassified, no extra payment will be allowed for solid rock excavation. It is the Contractor's responsibility to make any additional investigations.

4. CONFLICTING SECTIONS/STATEMENTS IN THE TECHNICAL SPECIFICATIONS

It shall be noted that if any provision in these Technical Specifications is in conflict and/or is inconsistent with any other section or provision in the Appendices (Bracken County Water District-Standard Specifications), then the most stringent shall apply per the interpretation of the ENGINEER.

5. FEDERAL/STATE/LOCAL REGULATIONS

The Contractor shall abide by all local and state laws or ordinances to the extent that such requirements do not conflict with federal laws or regulations.

6. SILTATION AND SOIL EROSION

The Contractor shall make every effort during construction to minimize siltation and soil erosion.

7. ROUGH CLEAN UP

- a. Rough clean up shall be performed on a daily basis concurring with the daily rate of production for pay items, amounts and/or quantities listed in the schedule of values.

- b. The Contractor is to provide sufficient labor and equipment for clean up as to not impede production schedules.
- c. Rough clean up shall be defined as follows:
 - 1. All open ditches shall be backfilled on a daily basis.
 - 2. Debris (rocks, roots, timber, etc.) shall be removed from the job site on a daily basis. This material may be stockpiled with the consent of the owner and the engineer in designated locations.
 - 3. Remaining backfill material (soil) shall be windrowed back on top of the ditch line, compacted and leveled giving consideration for settlement.
- d. At the direction of the engineer or his/her appointed representative, the Contractor shall readdress areas if identified as not being adequate in the initial rough clean process.

8. GEOTECHNICAL REPORT

The Geotechnical Report is included in the Technical Specifications. The Contractor shall be responsible for obtaining a Geotechnical engineer to confirm the Geotechnical conditions found within the report after excavation. If it is found that the conditions vary from the Geotechnical report, the Engineer shall be notified immediately.

9. CONTAINMENT

The tank contractor shall be responsible for any over spray, meeting EPA Regulations, and air quality regulations.

10. PROJECT REQUIREMENTS

All Contractors bidding this project should be aware of the following requirements; while not all inclusive, the list is representative of those items that will be enforced by the Engineer during this project.

- A. Installation of Trace Wire-Contractor to install #14 AWG THWN Insulated Copper Wire along all water main. Trace Wire shall be attached to the top of pipe. Tracer wire shall also be run up into meter boxes and valve boxes. All splices shall be made with an approved splicing device.
- B. METER SETTER: MUELLER 5/8 x 3/4 w/qtr turn ball valve and built in backflow device (ex. B-2404-2A). Setter shall be lockable. (Compression x FIP)

- C. TANDEM SETTER: MUELLER w/qtr turn ball valve and built in backflow device. Setter shall be lockable. (Compression x FIP)
- D. PRESSURE REGULATOR for tandem setter: WILKINS #600-7LU and shall include the necessary fittings and "S" tube and shall be installed in setter.
- E. SETTER FITTINGS: District's side: MUELLER 110 compression; Customer side: MUELLER H14222-6670.
- F. TAPPING SADDLES: MUELLER brass series S-1300. with CORP STOPS: MUELLER H15008/9.
- G. IF SELF-TAPPING USED: DRESSER series 294 for PVC or DRESSER series 193 for A/C.
- H. METERS: BADGER Positive displacement w/recordall registers.
- I. MAIN LINE CONTROL VALVES: PRV's, flow control valves, altitude valves etc. shall be BERMAD.
- J. TELEMETRY: Micro-Comm RTU's (By Owner)
- K. GATE VALVES: R.S. MUELLER series A2360.
- L. METER BOXES: 18" diameter ribbed green with a maximum length of 24". Meter setter shall be installed so that meter shut-off valve will be between 20" and 24" below the finished grade, unless other types or depth are approved by OWNER.
- M. METER LIDS: Raised type w/small pent nut with omni fit lid.
- N. MASTER METER: BADGER Turbo with integrated strainer and meter test port and shall have the capability of the addition of an RTR for remote read or control of pumps.
- O. Pump Station(s) meter(s) shall be BADGER TURBO with remote electronic register for use of pump control and remote read.
- P. When existing customer services are being changed to new line, the old service shall be either shut-off at corp stop or an approved termination device must be used (valve cap, plug, etc.). Crimping line is not sufficient.

- Q. All gate valves on branch line of tees and fire hydrant tees shall be mechanically restrained in addition to thrust blocking and shall be sized appropriately for the line used.
- R. All hydrants shall have appropriate sized valves before the hydrant.
- S. The top of ALL valve bonnets shall be a minimum of 18" below finished grade. COMPLETE valve box assemblies shall be installed at each valve with the correct lid for the type of valve and shall be flush with finished grade. All operating valves shall be no lower than 4.5" below finished grade.
- T. Complete valve boxes assembly shall be used on each valve. Valve box shall be at finish grade level with approved reinforced concrete collars around boxes. All lids shall fit correctly on the valve box.
- U. Each hydrant shall be at the correct depth recommended by the manufacturer and no outlet connection shall be closer than 18" to finished grade. All hydrants shall be preceded by an inline valve correctly sized to the inlet of the hydrant.
- V. All customer meters that are re-located shall be on customer side of new main. No looping service under or over main.
- W. Where meter vaults installed they shall be so designed that the line entering and exiting the vault shall be 18" minimum from the bottom of the vault and minimum of 30" below finish grade. All vaults shall be so constructed to have good drainage and manhole lid or hatch shall be large enough to allow the removal of the meters or pumps but shall be a minimum of 36" and shall be lockable shall be a minimum of 24" and lockable.

SECTION 01010
Summary of Work

PART 1 GENERAL

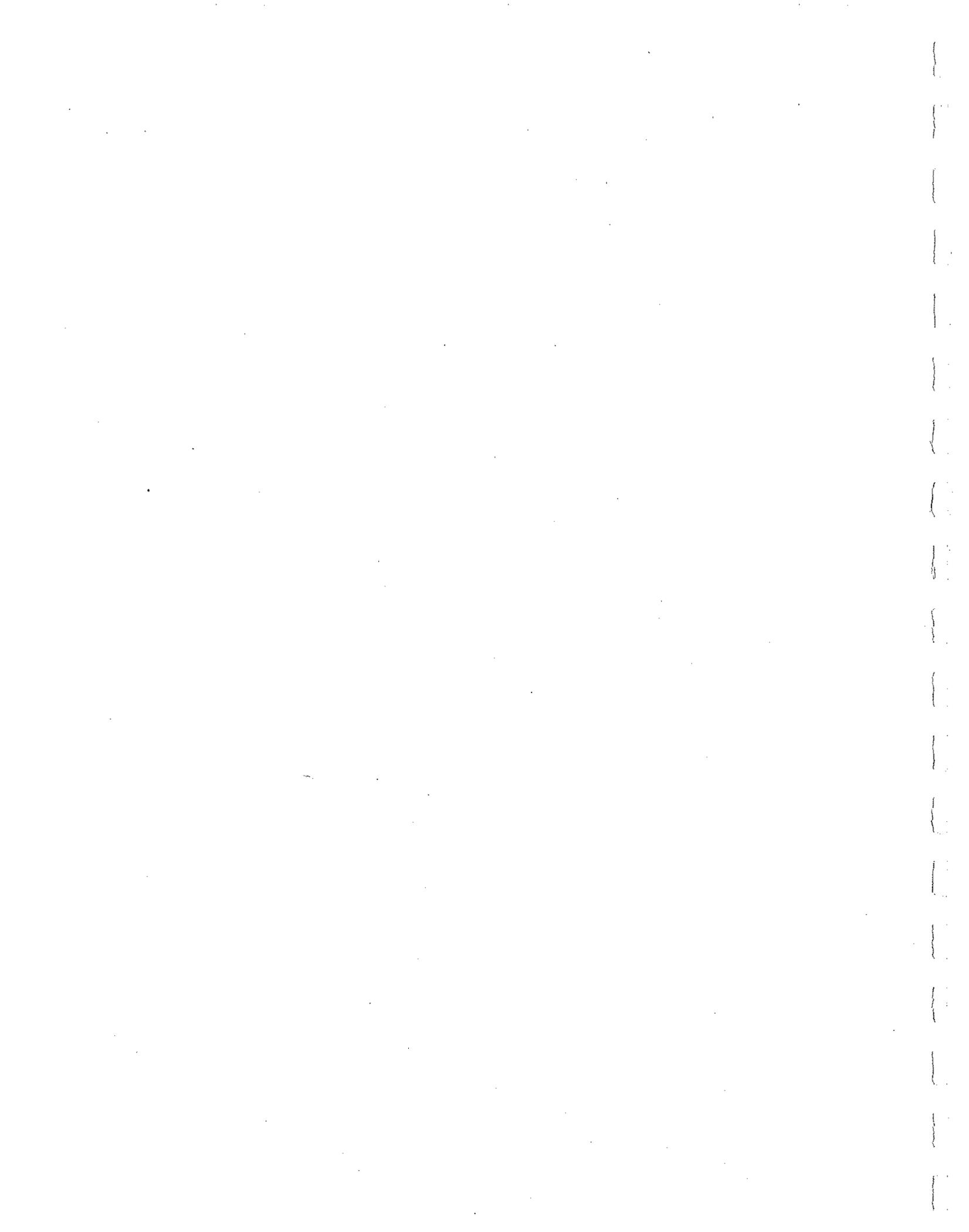
1.1 DESCRIPTION

- A. The Work to be performed under this Contract shall consist of furnishing all labor, materials, tools, equipment and incidentals and performing all Work required to construct complete in place and ready to operate:
1. 300,000 Gallon Elevated Tank
 2. Valve Vault
 3. Associated Piping and Site Work
- B. All Work described above shall be performed as shown on the Drawings and as specified.

1.2 PROJECT LOCATION

The equipment and materials to be furnished will be installed at the locations shown on the Drawings.

END OF SECTION



SECTION 01041
Project Coordination

PART 1 GENERAL

1.1 SCOPE

- A. Management of the Project shall be through the use of a logical method of construction planning, inspection, scheduling and cost value documentation.
- B. The work under this Section includes all surface and subsurface condition inspections and coordination by the Contractor necessary for the proper and complete performance of the Work.
- C. This Section applies to the work of every division and every section of these Specifications.

1.2 SITE CONDITIONS

- A. Inspection
 - 1. Prior to performing any work under a section, the Contractor shall carefully inspect the installed work of other trades and verify that all such work is complete to the point where the work under that section may properly commence.
 - 2. The Contractor shall verify that all materials, equipment and products to be installed under a section may be installed in strict accordance with the original design and pertinent reviewed shop drawings.
- B. Discrepancies
 - 1. In the event of discrepancy, immediately notify the Engineer.
 - 2. Do not proceed with construction in areas of discrepancy until all such discrepancies have been fully resolved.

1.3 COORDINATION

- A. Carefully coordinate work with all other trades and subcontractors to insure proper and adequate interface of the work of other trades and subcontractors with the work of every section of these Specifications.

- B. The Contractor shall coordinate operations with all utility companies in or adjacent to the area of Contractor's work. The Contractor shall require said utilities to identify in the field their property and provide drawings as necessary to locate them.

END OF SECTION

SECTION 01055
Construction Staking

PART 1 GENERAL

1.1 SCOPE

- A. Construction staking shall include all the surveying work required to layout the Work and control the location of the finished construction. The full responsibility for holding to alignment and grade shall rest upon the Contractor. All work under this Contract shall be constructed in accordance with the lines and grades on the Drawings or as given by the Engineer or Owner.
- B. The Owner will provide one bench mark and a baseline adjacent to the work site. The Contractor shall be responsible for setting offsets from these points and all other layout, staking and all other surveying required for the Work.
- C. The Contractor shall safeguard all points, stakes, grade marks, bench marks and monuments established on the Work, shall bear the cost of re-establishing same if disturbed and shall assume the entire expense of rectifying work improperly constructed due to failure to maintain and protect such established points, stakes and marks.
- D. Measurement of quantities for payment purposes which are different from Drawing dimensions is included in the Work.

1.2 QUALITY ASSURANCE

- A. The Contractor shall furnish documentation prepared by a surveyor currently registered in the State of Kentucky confirming that staking is being done to the lines and grades shown in the Contract Documents. This requires that the Contractor hire, at the Contractor's own expense, a currently registered surveyor, acceptable to the Owner, to provide ongoing confirmation of construction staking.
- B. Any deviations from the Drawings shall be confirmed by the Engineer prior to construction.
- C. Written certification of roadway or parking lot sub-base grades by a licensed surveyor, is required prior to paving installation.
- D. Written certification of structure base grade and structure corner locations is required prior to beginning construction of the structure.

- E. Quantities for payments measured under this Contract shall be certified by the approved currently registered surveyor.

PART 2 PRODUCTS

2.1 EQUIPMENT

The Contractor shall furnish and use surveying equipment and supplies maintained in good working order.

PART 3 EXECUTION

3.1 FINAL GRADES

"Blue Tops" shall be installed to control final paving subgrade. Any variance with plan grades shall be identified by the surveyor and confirmed by the Engineer prior to paving base installation.

3.2 UTILITIES

- A. Staking of utilities shall be done in accordance with generally accepted practice for the type of utility involved and as specified elsewhere in these Specifications.

END OF SECTION

SECTION 01340

Shop Drawings, Product Data and Samples

PART 1 GENERAL

1.1 SCOPE

- A. The work under this Section includes submittal to the Engineer of shop drawings, product data and samples required by the various sections of these Specifications.
- B. Submittal Contents: The submittal contents required are specified in each section.
- C. The following forms shall be used for all major components of the work:
 - 1. Typical Maintenance Summary Form
 - 2. Notice of Start of Manufacturing
 - 3. Notice of Shipment of Equipment
 - 4. Notice of Schedule Impact

The forms are included at the back of this section.

- D. Definitions: Submittals are categorized as follows:
 - 1. Shop Drawings
 - a. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance curves, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawing is prepared.
 - b. Provide newly-prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated) or appropriate number of prints hereof, with name or preparer (firm name) indicated. The Contract Drawings shall not be traced or reproduced by any method for use as or in lieu of detail shop drawings. Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by the Engineer to be used in connection with the Work.

- c. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, specification section, schedule or room numbers shown on the Contract Drawings.
- d. Minimum assembly drawings sheet size shall be 24 x 36-inches.
- e. Minimum detail sheet size shall be 8-1/2 x 11-inches.
- f. Minimum Scale:
 - (1) Assembly Drawings Sheet, Scale: 1-inch = 30 feet.
 - (2) Detail Sheet, Scale: 1/4-inch = 1 foot.

2. Product Data

- a. Product data includes standard printed information on materials, products and systems, not specially prepared for this Project, other than the designation of selections from among available choices printed therein.
- b. Collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the Project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked and special coordination requirements.

3. Samples

- a. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work, both as complete units and as smaller portions of units of work, either for limited visual inspection or, where indicated, for more detailed testing and analysis.
- b. Provide units identical with final condition of proposed materials or products for the work. Include "range" samples, not less than three units, where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where the Engineer's selection is required. Prepare samples to match the Engineer's sample where indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by the Engineer. Engineer will note

"test" samples, except as otherwise indicated, for other requirements, which are the exclusive responsibility of the Contractor.

4. Miscellaneous submittals related directly to the Work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the Work but not processed as shop drawings, product data or samples.

1.2 SPECIFIC CATEGORY REQUIREMENTS

A. General: Except as otherwise indicated in the individual work sections, comply with general requirements specified herein for each indicated category of submittal. Submittals shall contain:

1. The date of submittal and the dates of any previous submittals.
2. The Project title.
3. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.
4. The Names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
5. Identification of the product, with the Specification section number, permanent equipment tag numbers and applicable Drawing No.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Applicable standards, such as ASTM or Federal Specification numbers.
9. Notification to the Engineer in writing, at time of submissions, of any deviations on the submittals from requirements of the Contract Documents.

10. Identification of revisions on resubmittals.
11. An 8 x 3-inch blank space for Contractor and Engineer stamps.
12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the Work and of Contract Documents.
13. Submittal sheets or drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

1.3 ROUTING OF SUBMITTALS

- A. Submittals and routine correspondence shall be routed as follows:
 1. Supplier to Contractor (through representative if applicable)
 2. Contractor to Engineer
 3. Engineer to Contractor and Owner
 4. Contractor to Supplier

1.4 ADDRESS FOR COMMUNICATIONS

Engineer: Haworth, Meyer & Boleyn, Inc.
 3 HMB Circle
 Frankfort, KY 40601
 (502) 695-9800 FAX (502) 695-9810

PART 2 PRODUCTS

2.1 SHOP DRAWINGS

- A. Unless otherwise specifically directed by the Engineer, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the Work.
- B. Submit all shop assembly drawings, larger than 11 x 17-inches, in the form of one reproducible transparency with two opaque prints or bluelines.

- C. Submit all shop drawings, 11 x 17-inches and smaller, in the form of six opaque prints or bluelines.
- D. One reproducible for all submittals larger than 11 x 17-inches and no more than three prints of other submittals will be returned to the Contractor.

2.2 MANUFACTURER'S LITERATURE

- A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.
- B. Submit the number of copies which are required to be returned (not to exceed three) plus three copies which will be retained by the Engineer.

2.3 SAMPLES

- A. Samples shall illustrate materials, equipment or workmanship and established standards by which completed work is judged.
- B. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.
- C. Submit all samples in the quantity which is required to be returned plus one sample which will be retained by the Engineer.

2.4 COLORS

- A. Unless the precise color and pattern is specifically described in the Contract Documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.
- B. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

PART 3 EXECUTION

3.1 CONTRACTOR'S COORDINATION OF SUBMITTALS

- A. Prior to submittal for the Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:

1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.
 2. Coordinate as required with all trades and all public agencies involved.
 3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this Section.
 4. Clearly indicate in a letter or memorandum on the manufacturer's or fabricator's letterhead, all deviations from the Contract Documents.
- B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement.
- C. The Owner may backcharge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a "No Exceptions Taken" mark.
- D. Grouping of Submittals
1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items.
 2. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to the Engineer along with Contractor's comments as to compliance, non-compliance or features requiring special attention.
- E. Schedule of Submittals: Within 30 days of Contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the estimated date of submittal and the desired approval date for each shop drawing anticipated. A reasonable period shall be scheduled for review and comments. Time lost due to unacceptable submittals shall be the Contractor's responsibility and some time allowance for resubmittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.2 TIMING OF SUBMITTALS

- A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
- B. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal.

3.3 REVIEWED SHOP DRAWINGS

A. Engineer Review

1. Allow a minimum of 14 days for the Engineer's initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Engineer on each submittal as to whether processing time is critical to progress of the Work, and therefore the Work would be expedited if processing time could be foreshortened.
2. Acceptable submittals will be marked "No Exceptions Taken". A minimum of three copies will be retained by the Engineer for Engineer's and the Owner's use and the remaining copies will be returned to the Contractor.
3. Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Contractor may order, fabricate and ship the items included in the submittals, provided the indicated corrections are made. Drawings must be resubmitted for review and marked "No Exceptions Taken" prior to installation or use of products.
4. Submittals marked "Amend and Resubmit" must be revised to reflect required changes and the initial review procedure repeated.
5. The "Rejected - See Remarks" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.
6. Only two copies of items marked "Amend and Resubmit" and "Rejected - See Remarks" will be reviewed and marked. One copy will be retained by

the Engineer and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.

- B. No work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer's stamp.
- C. Substitutions: In the event the Contractor obtains the Engineer's approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor's own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.
- D. Use of the "No Exceptions Taken" notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer's review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

3.4 RESUBMISSION REQUIREMENTS

- A. Shop Drawings
 - 1. Revise initial drawings as required and resubmit as specified for initial submittal, with the resubmittal number shown.
 - 2. Indicate on drawings all changes which have been made other than those requested by the Engineer.
- B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with the resubmittal number shown.

END OF SECTION TEXT

FORMS FOLLOW

TYPICAL MAINTENANCE SUMMARY FORM

1. EQUIPMENT ITEM _____
2. MANUFACTURER _____
3. EQUIPMENT IDENTIFICATION NUMBER(S) _____
4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____
5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____
6. MANUFACTURER'S LOCAL REPRESENTATIVE
- Name _____ Telephone No. _____
- Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation	Frequency	Lubricant (If Applicable)	Comments
List briefly each maintenance operation req'd and refer to specific information in mfr's std. maintenance manual, if applicable.	List req'd frequency of each maintenance operation.	Refer by symbol to lubricant req'd.	

8. LUBRICANT LIST

Reference Symbol	Shell	Std. Oil	Gulf	Arco	Or Equal
List symbols used in Item 7. above.	List equivalent lubricants, as distributed by each Manufacturer for the specific use recommended.				

9. SPARE PARTS. Include your recommendations regarding what spare part, if any, should be kept on the job.

NOTICE OF START OF MANUFACTURING

DATE: _____

TO: _____

ATTENTION: _____

RE: Equipment Contract No. _____

Name of Contract: _____

Type of Equipment: _____

Quantity: _____

Scheduled Completion of Assembly: _____

Scheduled Date of Shipment: _____

NOTE: Delay to the above schedule which will affect shipment date by 5 days or more must be reported on the Schedule Impact form.

By: _____ Date: _____

Title: _____

ACTUAL MANUFACTURING AGENT:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

NOTICE OF SHIPMENT OF EQUIPMENT

DATE: _____

TO: _____

ATTENTION: _____

RE: Equipment Contract No. _____

Name of Contract: _____

Type of Equipment Being Shipped: _____

QTY. DESCRIPTION (Include Equipment Numbers) SERIALS (If Applicable):

ATTACH BILL(S) OF LADING FOR ALL SHIPMENTS TO THIS FORM

Date of Shipment: _____

By: _____

Title: _____

ACTUAL MANUFACTURING AGENT:

Name: _____

01340-12

Shop Drawings, Product Data and Samples

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

NOTICE OF SCHEDULE IMPACT

(Send this form to the Owner and Engineer if delay is over 5 days)

DATE: _____

TO: _____

ATTENTION: _____

RE; Equipment Contract No. _____

Name of Contract: _____

Type of Equipment Affected: _____

Nature of Delay: _____

New Estimated Date for Final Shop Drawings: _____

New Estimated Date for Start of Manufacture: _____

New Estimated Date for Finish Manufacture: _____

New Estimated Date for Shipment: _____

New Estimated Date for Arrival at Jobsite: _____

By: _____

Title: _____

ACTUAL MANUFACTURING AGENT:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Telephone: _____

SECTION 01410
Testing Laboratory Services

PART 1 GENERAL

1.1 SCOPE

- A. This Section includes testing which the Owner may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.
- B. This work also includes all testing required by the Owner to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength and slump testing, soil compaction, etc.
- C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer, e.g., testing of pipe.
- D. The testing laboratory or laboratories will be selected by the Contractor and approved by the Owner. The testing laboratory or laboratories will work for the Contractor subject to continual approval of the Owner.

1.2 PAYMENT FOR TESTING SERVICES

- A. The cost of testing services required by the Contract to be provided by the Contractor shall be paid for by the Contractor directly, i.e., concrete testing, soil compaction, and asphalt testing.
- B. The cost of additional testing services not specifically required in the Specifications, but requested by the Owner or Engineer, shall be paid for by the Owner.
- C. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid for by the Owner.
- D. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor. Retesting shall be performed by a testing laboratory working for the Owner.

1.3 LABORATORY DUTIES

- A. Cooperate with the Owner, Engineer and Contractor.

- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling and testing of materials.
 - 1. Comply with specified standards, ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance with requirements of the Contract Documents.
- D. Promptly notify the Engineer and Contractor of irregularity or deficiency of work which are observed during performance of services.
- E. Promptly submit three copies (two copies to the Engineer and one copy to the Contractor) of report of inspections and tests in addition to those additional copies required by the Contractor with the following information included:
 - 1. Date issued
 - 2. Project title and number
 - 3. Testing laboratory name and address
 - 4. Name and signature of inspector
 - 5. Date of inspection or sampling
 - 6. Record of temperature and weather
 - 7. Date of test
 - 8. Identification of product and Specification section
 - 9. Location of Project
 - 10. Type of inspection or test
 - 11. Results of test
 - 12. Observations regarding compliance with the Contract Documents
- F. Perform additional services as required.
- G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the Work.

1.4 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to Work and/or manufacturer's requirements.
- B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.
- C. Furnish copies of mill test reports.
- D. Furnish required labor and facilities to:
 - 1. Provide access to Work to be tested;
 - 2. Obtain and handle samples at the site;
 - 3. Facilitate inspections and tests;
 - 4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.
- E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.
- F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.
- G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

1.5 QUALITY ASSURANCE

Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.6 PRODUCT HANDLING

Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.

1.7 FURNISHING MATERIALS

The Contractor shall be responsible for furnishing all materials necessary for testing.

1.8 CODE COMPLIANCE TESTING

Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of, and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.9 CONTRACTOR'S CONVENIENCE TESTING

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.10 SCHEDULES FOR TESTING**A. Establishing Schedule**

1. The Contractor shall, by advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.
2. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back-charged to the Contractor and shall not be borne by the Owner.

1.11 TAKING SPECIMENS

Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

1.12 TRANSPORTING SAMPLES

The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

END OF SECTION



SECTION 01562

Dust Control

PART 1 GENERAL

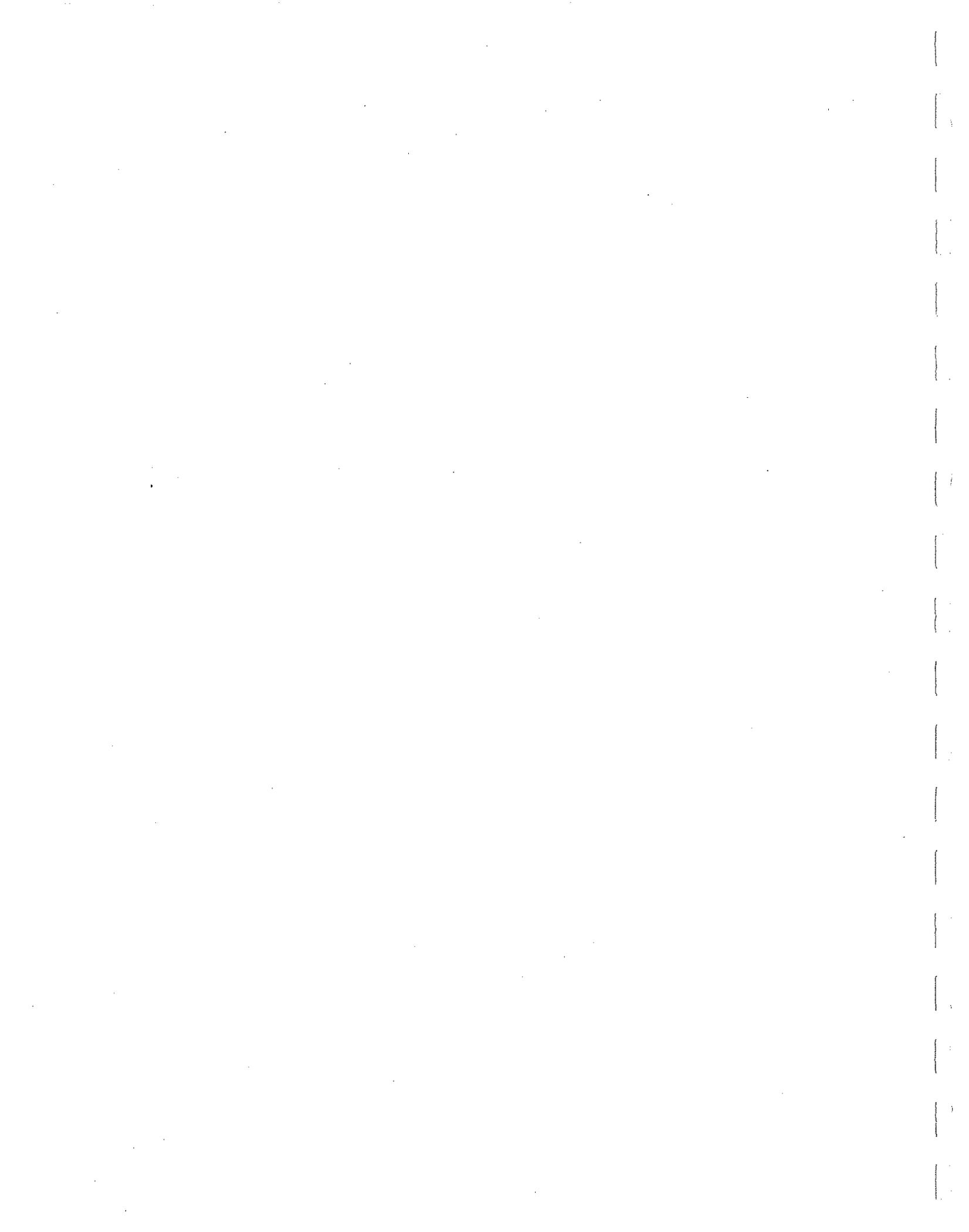
1.1 SCOPE

Limit blowing dust caused by construction operations by applying water or employing other appropriate means or methods to maintain dust control, subject to the approval of the Owner. As a minimum, this may require the use of a water wagon twice a day to suppress dusty conditions.

1.2 PROTECTION OF ADJACENT PROPERTY

- A. The Bidders shall visit the site and note the buildings, landscaping, roads, parking areas and other facilities near the Work site that may be damaged by their operations. The Contractor shall make adequate provision to fully protect the surrounding area and will be held fully responsible for all damages resulting from Contractor's operations.
- B. Protect all existing facilities (indoors or out) from damage by dust, fumes, spray or spills (indoors or out). Protect motors, bearings, electrical gear, instrumentation and building or other surfaces from dirt, dust, welding fumes, paint spray, spills or droppings causing wear, corrosion, malfunction, failure or defacement by enclosure, sprinkling or other dust palliatives, masking and covering, exhausting or containment.

END OF SECTION



SECTION 01569
Safety in Water Works

PART 1 GENERAL

1.1 SCOPE

- A. The Contractor shall be responsible for conducting all Work in a safe manner and shall take reasonable precautions to ensure the safety and protection of workers, property and the general public.
- B. All construction shall be conducted in accordance with the latest applicable requirements for Part 1926 of the Occupational Safety and Health Act, Safety and Health Regulations for Construction, Section 107 of the Contract Work Hours and Safety Standards Act, as well as any other local, state or federal safety codes and regulations.
- C. The Contractor shall designate a trained and qualified employee who is to be responsible for ensuring that the Work is performed safely and in conformance with all applicable regulations.
- D. The Contractor shall determine the safety hazards involved in prosecuting the Work and the precautions necessary to conduct the Work safely. If the Contractor is unsure as to any special hazards which may be unique to the various processes and facilities at the treatment plant, it shall be Contractor's responsibility to determine such information prior to beginning the Work.
- E. The Contractor shall bear all risks associated with performing the Work and shall fully indemnify and hold harmless the Owner and Engineer.

END OF SECTION



SECTION 01610
Transportation and Handling

PART 1 GENERAL

1.1 SCOPE

- A. The Contractor shall provide transportation of all equipment, materials and products furnished under these Contract Documents to the Work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the Work.
- B. All equipment, materials and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the Work.

1.2 TRANSPORTATION

- A. All equipment shall be suitably boxed, crated or otherwise protected during transportation.
- B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.
- C. Small items and appurtenances such as gauges, valves, switches, instruments and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.3 HANDLING

- A. All equipment, materials and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.
- B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.

- C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.

- D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

END OF SECTION

SECTION 01611
Storage and Protection

PART 1 GENERAL

1.1 SCOPE

The work under this Section includes, but is not necessarily limited to, the furnishing of all labor, tools and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the Work.

1.2 STORAGE AND PROTECTION

A. Storage

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the Engineer.
2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the Owner.
3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.
4. All materials shall meet the requirements of these Specifications at the time that they are used in the Work.
5. Store products in accordance with manufacturer's instructions.

B. Protection

1. Use all means necessary to protect the materials, equipment and products of every section before, during and after installation and to protect the installed work and materials of all other trades.
2. All materials shall be delivered, stored and handled to prevent the inclusion of foreign materials and damage by water, breakage or other causes.
3. Substantially constructed weathertight storage sheds with raised floors shall be provided and maintained as may be required to protect adequately those materials and products stored on the site which may require protection from damage by the elements.

- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Engineer and at no additional cost to the Owner.
- D. All equipment shall be boxed, crated or otherwise completely enclosed and protected during shipment, handling and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry at all times. Compressors, blowers, pumps, motors, valves, control panels, instrumentation, electrical equipment and other equipment having antifriction or sleeve bearings shall be stored in weathertight warehouses which are maintained at a temperature of at least 60 degrees F. Other equipment may be stored outside under cover. All equipment shall be stored above ground level and adequately supported on wood blocking or other approved support material. Printed storage instructions of the manufacturers shall be strictly adhered to.
- E. Painted, anodized or otherwise coated surfaces shall be protected against impact, abrasion, discoloration and other damage. All coated surfaces which are damaged prior to acceptance of equipment shall be cleaned and coated to the satisfaction of the Engineer with the same or equivalent coating used in the original application.
- F. Flanged openings on equipment shall be covered with suitable solid wooden or metal blanks securely bolted to the flange using a minimum of four bolts and a suitable rubber gasket. Ends of threaded pipe and fittings shall be sealed watertight with metal or plastic caps. Threaded openings shall be sealed watertight with metal or plastic plugs. Other openings shall be sealed with two layers of 6 mil polyethylene securely taped in place with waterproof tape.
- G. After storage, rubber parts such as valve seats, diaphragms, expansion joints, gaskets, hoses and shaft couplings shall be checked for hardening or cracking. Deteriorated parts shall be replaced prior to start-up by the Contractor at Contractor's own expense.
- H. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

END OF SECTION

SECTION 01630
Substitutions and Options

PART 1 GENERAL

1.1 SCOPE

This Section outlines the restrictions and requirements for substitutions, product and manufacturer options, and construction method options.

1.2 DEFINITIONS

- A. For the purposes of these Contract Documents, a "substitute item" shall be defined as one of the following:
1. A product or manufacturer offered as a replacement to a specified product or manufacturer.
 2. A product or manufacturer offered in addition to a specified product or manufacturer.
- B. For the purposes of these Contract Documents, a "substitute construction method" shall be defined as one of the following:
1. A mean, method, technique, sequence or procedure of construction offered as a replacement for a specified mean, method, technique, sequence or procedure of construction.
 2. A mean, method, technique, sequence or procedure of construction offered in addition to a specified mean, method, technique, sequence or procedure of construction.

1.3 GENERAL

- A. An item or construction method, which is offered where no specific product, manufacturer, mean, method, technique, sequence or procedure of construction is specified or shown on the Drawings, shall not be considered a substitute and shall be at the option of the Contractor, subject to the provisions in the Contract Documents for that item or construction method.
- B. For products specified only by a referenced standard, the Contractor may select any product by any manufacturer, which meets the requirements of the Specifications, unless indicated otherwise in the Contract Documents.

- C. If the manufacturer is named on the Drawings or in the Specifications as an acceptable manufacturer, products of that manufacturer meeting all requirements of the Specifications and Drawings are acceptable.
- D. Whenever the Engineer's design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or listed first in the list of approved manufacturers in the Specifications. Any Bidder intending to furnish products of other than the first listed manufacturer, or furnish substitute items, shall
 - 1. Verify that the item being furnished will fit in the space allowed, perform the same functions and have the same capabilities as the item specified.
 - 2. Include in its Bid the cost of all accessory items which may be required by the other listed substitute product,
 - 3. Include the cost of any architectural, structural, mechanical, piping, electrical or other modifications required, and
 - 4. Include the cost of required additional work by the Engineer, if any, to accommodate the item.

1.4 APPROVALS

- A. Approval, of a substitution as an acceptable manufacturer, of the Engineer is dependent on determination that the product offered
 - 1. is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, service life and other criteria to that on which the design is based, and
 - 2. will require no major modifications to structures, electrical systems, control systems or piping systems.

1.5 SUBSTITUTIONS AND OPTIONS

- A. See Bid Schedule for allowance of substitutions.
- B. After Notice to Proceed
 - 1. Substitute items will be considered for acceptable manufacturers in the Specification.

2. Where items are specified by referenced standard or specified as indicated in Article 1.3, Paragraph A. above, such items shall be submitted to the Engineer for review.
3. The Contractor shall submit shop drawings on the substitute item for the Engineer's review in accordance with the Section 01340.

C. Prior to Opening of Bids

1. No consideration or approvals will be made for products specified by a referenced standard, or specified as indicated in Article 1.3, Paragraph A. above. Such consideration may occur only after the Notice to Proceed.
2. No consideration or approvals will be made for products being offered where the term "equal to" precedes the name of an approved product. Such substitution consideration may occur only after the Notice to Proceed.

END OF SECTION



SECTION 01640
General Equipment Stipulations

PART 1 GENERAL

1.1 SCOPE

These general equipment stipulations apply, in general, to all equipment and piping. They supplement the detailed equipment Specifications, but in case of conflict, the detailed equipment Specifications shall govern.

1.2 COORDINATION

The Contractor shall assume full responsibility for the coordination of the installation of all equipment, materials and products furnished under these Contract Documents. The Contractor shall be completely responsible for verification that all structures, piping and equipment components furnished by the Contractor and/or subcontractors and suppliers are compatible. The Contractor shall start-up each equipment system and shall make all necessary alterations. All such alterations shall be made at the Contractor's expense.

1.3 ADAPTATION AND LOCATION OF EQUIPMENT

- A. No responsibility for alteration of a planned structure to accommodate other types of equipment will be assumed by the Owner. Equipment which requires alteration of the structures will be considered only if the Contractor assumes all responsibility for making and coordinating all necessary alterations. All such alterations shall be made at the Contractor's expense.

1.4 PATENT ROYALTIES

All royalties and fees for patents covering materials, articles, apparatus, devices or equipment shall be included in prices Bid by the Contractor.

1.5 EQUIPMENT WARRANTY

The Contractor shall warrant all equipment against faulty or inadequate design, improper assembly or erection, defective materials, breakage or other failure. The warranty period shall be defined in Section 01740 of these Specifications.

1.6 WORKMANSHIP AND MATERIALS

- A. All equipment shall be designed, fabricated and assembled in accordance with the most modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any

time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall be new and shall not have been in service at any time prior to delivery, except as required by tests.

- B. Materials shall be suitable for service conditions. Iron castings shall be tough, close grained, gray iron free from blowholes, flaws or excessive shrinkage and shall conform to ASTM A 48, Class 30 minimum. Plugging of defective castings shall not be permitted. Castings shall be annealed to remove internal stresses prior to machining and shall have the mark number and heat number cast on them.
- C. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads.

1.7 LUBRICATION AND LUBRICATION FITTINGS (Not Used)

1.8 SAFETY GUARDS (Not Used)

1.9 EQUIPMENT BASES (Not Used)

1.10 ALIGNMENT OF MOTORS AND EQUIPMENT (Not Used)

1.11 GROUTING (Not Used)

1.12 WELDING AND BRAZING

- A. All welds shall be sound and free from embedded scale and slag. All butt welds shall be continuous, and where exposed to view, shall be ground smooth. All continuous welds shall be gas and liquid-tight. Welds in piping shall have full penetration and shall be smooth on the inside of the pipe. Intermittent welds shall have an effective length of at least 2-inches and shall be spaced not more than 6-inches apart.
- B. All welding of steel and aluminum, including materials, welding techniques, general safety practices, appearance and quality of welds, and methods of correcting defective work, shall conform to the latest requirements of AWS Specifications. Structural steel welding shall conform to the requirements of the AWS Structural Welding Code. The general recommendations and requirements of the AWS Structural Welding Code shall also apply to welded aluminum structures. The welding process and welding operators shall meet qualification tests and welding performance tests in accordance with the latest provisions of ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications. Welding process and qualification procedures for welding of pipe shall conform to the latest requirements of ANSI B31.1, Section 327, Welding,

and Section 328, Brazing and Soldering. All welding qualification tests shall be witnessed by the Engineer, except as provided herein. All costs associated with the qualification or testing of welders and welding operators shall be borne by the Contractor.

- C. Reports certifying that the welding procedures, welders and welding operators that the Contractor intends to use meet the requirements specified above. These reports shall be submitted to the Engineer prior to beginning the Work. In the case of welder qualifications for shop welding and for carbon steel field welding, welders presenting certified qualification papers validated within the preceding six month period will not be required to take the qualification tests. In the case of field welding of stainless steel or aluminum, all welders shall be required to take the qualification tests regardless of past experience or availability of certified qualification papers.
- D. Field welding practices shall conform to OSHA construction standards, Part 1926, Subpart J, Welding and Cutting. Shop welding practices shall conform to OSHA General Industry Standards, Part 1910, Subpart Q, Welding, Cutting, and Brazing.
- E. Welding electrodes for structural steel shall conform to the standard recommendations of the AISC. Welding electrodes for stainless steel shall conform to applicable AWS Specifications and shall be as recommended by "Welded Austenitic Chromium-Nickel Stainless Steels, Techniques and Properties", published by the International Nickel Company, New York, New York. Welding electrodes for aluminum shall conform to applicable AWS Specifications.
- F. Each welder and welding operator must identify all welds with welder's assigned symbol.
- G. Welders performing unsatisfactory work shall be removed from the welding process.
- H. The Owner may inspect any weld by radiographic or other means. Welds not in accordance with the requirements specified herein shall be repaired or replaced at the Contractor's expense. Excessive porosity, nonmetallic inclusions, lack of fusion, incomplete penetration and cracking shall constitute grounds for rejection of welds.

1.13 ERECTION AND SETTING

- A. In the erection and setting of all fabricated equipment, the Contractor shall exercise care to ensure that each item of equipment is adequately supported so as not to bend or distort under its own weight until adequate foundation support and anchorage are provided. Where lifting lugs, angles or clips are provided on

equipment, they shall be used in erecting and setting the equipment. Erection and setting of equipment and structural steel shall conform to the requirements of OSHA Construction Standards, Part 1926, Subpart R, Steel Erection, Subpart H, Material Handling, Storage, Use, and Disposal, and Subpart N, Cranes, Derricks, Hoists, and Conveyors. Erection of structural steel shall conform to the latest requirements of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.

- B. During placement and prior to any grouting or connection of adjacent piping, the equipment shall be leveled and aligned true to level, plumb, alignment and grade with all parts bearing or fitting the structure or equipment accurately and securely. It shall not be permitted to cock out of alignment, nor shall the Contractor redrill, reshape or force fit any fabricated items.
- C. The Contractor shall take all measurements necessary to properly fit Contractor's work in the field, and Contractor shall be governed by and responsible for these measurements and the proper working out of all details. The Contractor shall be responsible for the correct fitting of all work in the field and the accurate placement of all anchor bolts installed by Contractor.
- D. The Contractor shall bring all parts to be erected or assembled into close contact. Before assembly, all surfaces to be in contact with each other shall be thoroughly cleaned. Drift pins may be used only for bringing members into position, never to enlarge or distort holes. Torching or burning of holes or cutting of fabricated items to correct misalignment or shop errors shall not be permitted. Enlargement of holes necessary to make field connections shall be done only with the Engineer's approval by reaming with twist drills and in a manner acceptable to Engineer.
- E. All equipment shall be furnished with suitable eyebolt lifting lugs or lifting angles to facilitate handling.

1.14 SPECIAL TOOLS AND ACCESSORIES

- A. Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments and accessories required for proper maintenance. Special tools and accessories shall include those tools and accessories not normally available in an industrial hardware or mill supply house. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

1.15 SHOP PRIMING AND PAINTING (Not Used)

1.16 FIELD PRIMING (Not Used)**1.17 FIELD PAINTING (Not Used)****1.18 GALVANIZING**

- A. All galvanizing shall be done by the hot-dip process after fabrication in conformity with requirements of ASTM A 123, A 153, A 384 and A 385. Articles to be galvanized shall be pickled before galvanizing.
- B. Where galvanized bolts are specified or required by the Drawings, cadmium or zinc plated bolts will be acceptable provided cadmium plating conforms to ASTM A 165, Type NS and zinc plating conforms to ASTM A 164, Type GS.
- C. Areas of galvanizing damaged by welding or burning or otherwise damaged shall be thoroughly stripped and cleaned and recoated with zinc to the required thickness by the hot dip process.
- D. Galvanized articles shall be free from uncoated spots, blisters, flux, black spots, dross, projections and other defects not consistent with acceptable galvanizing practice.
- E. Zinc and cadmium plating shall be subject to visual examination to determine uniformity of coating. The Engineer may require that the coating uniformity be tested in accordance with ASTM A 239.

1.19 PROTECTION AND STORAGE

- A. All equipment shall be boxed, crated or otherwise completely enclosed and protected during shipment, handling and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry at all times.
- B. Painted, anodized or otherwise coated surfaces shall be protected against impact, abrasion, discoloration and other damage. All coated surfaces which are damaged prior to acceptance of equipment shall be cleaned and coated to the satisfaction of the Engineer with the same or equivalent coating used in the original application.
- C. Flanged openings on equipment shall be covered with suitable solid wooden or metal blanks securely bolted to the flange using a minimum of four bolts and a suitable rubber gasket. Ends of threaded pipe and fittings shall be sealed watertight with metal or plastic caps. Threaded openings shall be sealed watertight with metal or plastic plugs. Other openings shall be sealed with two layers of 6 mil polyethylene securely taped in place with waterproof tape.

General Equipment Stipulations

- D. After storage, rubber parts such as valve seats, diaphragms, expansion joints, gaskets, hoses and shaft couplings shall be checked for hardening or cracking. Deteriorated parts shall be replaced prior to start-up by the Contractor at Contractor's own expense.

1.20 VIBRATION TESTING (Not Used)

1.21 HYDRAULIC SYSTEMS (Not Used)

1.22 NOISE CRITERIA (Not Used)

1.23 INSTALLATION CHECK (Not Used)

1.24 FIELD TESTING (Not Used)

1.25 IDENTIFICATION OF PIPING AND EQUIPMENT (Not Used)

1.26 SAFETY SIGNS (Not Used)

END OF SECTION

SECTION 01710

Cleaning

PART 1 GENERAL

1.1 SCOPE

This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

1.2 QUALITY ASSURANCE

- A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.
- B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.3 HAZARDOUS MATERIAL AND WASTE

- A. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in WFPA approved landfills as applicable.
- B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.
- C. Burning or burying rubbish and waste materials on the site shall not be allowed.
- D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.

1.4 DISPOSAL OF SURPLUS MATERIALS

Unless otherwise shown on the Drawings, specified or directed, the Contractor shall legally dispose off the site all surplus materials and equipment from demolition and shall provide suitable off-site disposal site, or utilize a site designated by the Owner.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

Use only the cleaning materials, methods and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 EXECUTION

3.1 PROGRESS CLEANING

A. General

1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this Work.
2. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Restack materials stored on site weekly.
3. At all times maintain the site in a neat and orderly condition which meets the approval of the Engineer.

C. Structures

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by using a hand-held broom.
3. As required preparatory to installation of successive materials, clean the structures or pertinent portions as recommended by the manufacturer of the successive material.
4. Following the installation of finish floor materials, clean the finish floor daily. "Clean", for the purpose of this paragraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the Engineer, may be injurious to the finish floor material.
5. Schedule cleaning operation so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

3.2 FINAL CLEANING

- A. Definitions: Unless otherwise specifically specified, "clean" for the purpose of this Article shall be interpreted as the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.
- B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 3.01 above.
- C. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.
- D. Structures
 1. Remove all traces of soil, waste material, splashed material, and other foreign matter to provide a uniform degree of exterior cleanliness. Visually inspect all exterior surfaces and remove all traces of soil, waste material, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of

stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.

2. Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges and other foreign matter. Remove all paint droppings, spots, stains and dirt from finished surfaces.
 3. Clean all glass inside and outside.
 4. Polish all surfaces requiring the routine application of buffed polish. Provide and apply polish as recommended by the manufacturer of the material being polished.
- E. **Post-Construction Cleanup:** All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, as directed by the Engineer.
- F. **Restoration of Landscape Damage:** Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. The Engineer will decide what method of restoration shall be used.
- G. **Timing:** Schedule final cleaning as approved by the Engineer to enable the Owner to accept the Project.

3.3 **CLEANING DURING OWNER'S OCCUPANCY**

Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Engineer in accordance with the Supplementary Conditions of the Contract Documents.

END OF SECTION

SECTION 01720
Record Documents

PART 1 GENERAL

1.1 SCOPE

- A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording and submitting of project record documents as herein specified.
- B. Record documents include, but are not limited to:
 - 1. Drawings;
 - 2. Specifications;
 - 3. Change orders and other modifications to the Contract;
 - 4. Engineer field orders or written instructions, including Requests for Information (RFI) and Clarification Memorandums;
 - 5. Reviewed shop drawings, product data and samples;
 - 6. Test records.
- C. The Contractor shall maintain on the Project site throughout the Contract Time an up to date set of Record Drawings.

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Storage
 - 1. Store documents and samples in the Contractor's field office, apart from documents used for construction.
 - 2. Provide files and racks for storage of documents.
 - 3. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with format of these Specifications.

C. Maintenance

1. Maintain documents in a clean, dry, legible condition and in good order.
2. Do not use record documents for construction purposes.
3. Maintain at the site for the Owner one copy of all record documents.

D. Make documents and samples available at all times for inspection by Engineer.

E. Failure to maintain the Record Documents in a satisfactory manner may be cause for withholding of a certificate for payment.

1.3. QUALITY ASSURANCE

A. Unless noted otherwise, Record Drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.

B. Unless noted otherwise, Record Drawings shall provide elevations to the nearest 0.01 foot for all pertinent items constructed by the Contractor.

1.4 RECORDING

A. Label each document "PROJECT RECORD" in neat, large printed letters.

B. Recording

1. Record information concurrently with construction progress.
2. Do not conceal any work until required information is recorded.

1.5 RECORD DRAWINGS

A. Record Drawings shall be reproducible, shall have a title block indicating that the drawings are Record Drawings, the name of the company preparing the Record Drawings, and the date the Record Drawings were prepared. The Contractor will be provided paper sepias of the Drawings, or it may elect to provide reproducible drawings via another method. Reproducible shall be defined as being translucent so as to allow a blue-line print to be produced.

B. Legibly mark drawings to record actual construction, including:

1. All Construction
 - a. Changes of dimension and detail.

- b. Changes made by Requests for Information (RFI), field order, clarification memorandums or by change order.
 - c. Details not on original Drawings.
2. Site Improvements, Including Underground Utilities
- a. Horizontal and vertical locations of all exposed and underground utilities and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.
 - b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.
 - c. The locations shall be referenced to at least two easily identifiable, permanent landmarks (e.g., power poles, valve markers, etc.) or benchmarks.
 - d. The Record Drawings shall include the horizontal angle and distance between manhole covers.
3. Structures
- a. Depths of various elements of foundation in relation to finish first floor datum or top of wall.
 - b. Location of internal and buried utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

1.6 SPECIFICATIONS

- A. Legibly mark each section to record:
- 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 2. Changes made by Requests for Information (RFI), field order, clarification memorandums, or by change order.

1.7 SUBMITTAL

- A. At contract closeout, deliver Record Documents to the Engineer for the Owner.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Title and number of each record document
 - 5. Signature of Contractor or Contractor's authorized representative

END OF SECTION

SECTION 01740
Warranties and Bonds

PART 1 GENERAL

1.1 PROJECT MAINTENANCE AND WARRANTY

- A. Maintain and keep in good repair the Work covered by these Drawings and Specifications until acceptance by the Owner.
- B. The Contractor shall warrant for a period of one year from the date of Owner's written acceptance of certain segments of the Work and/or Owner's written final acceptance of the Project, as defined in the Contract Documents, that the completed Work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.
- C. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.
- D. In the event of multiple failures of major consequences prior to the expiration of the one year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new 12 month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over-or under-lubrication and using maintenance procedures not conforming with

published maintenance instructions, shall be exempted from the scope of the one year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be disassembled, inspected, modified or replaced as necessary and rewarranted for one year.

- E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.
- F. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.
- G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.
- H. In the event the Contractor fails to proceed to remedy the defects upon notification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.
- I. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.
- J. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION

SECTION 02010
Subsurface Conditions

PART 1 GENERAL

1.1 DESCRIPTION

- A. Soil boring logs are shown in the report entitled "Report of Geotechnical Exploration for Elevated Water Storage Tank, Bracken County Water District, Site East of Brooksville, Bracken County, Kentucky dated August 17, 2005. This report is included as Appendix A of these specifications, additional copies of this report may be obtained upon request at the office of HMB, Inc.
- B. This soil investigation information is offered as an aid in bidding only and is not a part of the Contract Documents. The boring logs are available for the Contractor's information, but are not a warranty of subsurface conditions. The Owner, Engineer and geotechnical engineer assume no responsibility for any variation between materials encountered during construction and those indicated on the boring logs, nor for any variation between the location of the water table encountered and that indicated on the boring logs at the date borings were taken.
- C. Additional Investigation: The Contractor shall visit the site and become acquainted with site conditions. Prior to bidding, prospective Contractors may make their own site and subsurface investigations to satisfy themselves with site and subsurface conditions. The Contractor shall be responsible for obtaining rights of ingress and egress to private property for site and subsurface investigation and shall assume all responsibility for any damage to property caused as a result of the Contractor's investigation.
- D. Location of Borings: Contractors shall be responsible for making their own determination of the location of the soil borings on this Project.
- E. The Contractor shall retain the services of the Geotechnical consultant to verify the adequacy of the bearing stratum after the Contractor has carried out the excavation and before any concrete or reinforcement is placed. The concrete foundation shall be designed by the Contractor based upon the recommendations in the Geotechnical report.

END OF SECTION



SECTION 02100

Site Preparation

PART 1 GENERAL

1.1 SCOPE

- A. This Section describes materials and equipment to be utilized and requirements for their use in preparing the work site for construction. The Contractor shall furnish all materials, equipment and labor necessary to complete the work.
- B. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

1.2 CLEARING AND GRUBBING

- A. Within the limits shown on the Drawings, the site will be cleared and grubbed to prepare for construction.
- B. Clearing
 - 1. All vegetable growth such as trees, shrubs, brush, logs, upturned stumps and roots of down trees, and other similar items shall be removed and disposed of properly by the Contractor as specified below. Cultivated growth shall be removed and trees felled as necessary within the construction work site and as indicated.
 - 2. Where the tree limb structure interferes with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the appropriate utility.
 - 3. All buildings, fences, lumber piles, trash and obstructions, except utility poles, shall be removed and disposed of by the Contractor. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.
 - 4. All fences adjoining any excavation or embankment that may be damaged or buried shall be carefully removed, stored and replaced.
- C. All stumps, roots, foundations and planking embedded in the ground shall be removed and disposed of properly by the Contractor as specified below. Piling and butts of utility poles shall be removed to a minimum depth of two feet below the limits of excavation for structures, trenches and roadways or two feet below finish grade, whichever is lower.

1.3 PRELIMINARY GRADING

- A. Before beginning construction, the Contractor shall grade the entire work site to conform, in general, to the finish elevations shown on the Drawings. The Drawings show both existing contour elevations and finished contour elevations.

1.4 TESTING AND INSPECTION SERVICES

- A. Soil testing will be performed by an independent testing laboratory selected by the Contractor and approved for by the Owner. The Contractor will be responsible for all cost associated with the required soil testing.

- B. The soils testing laboratory is responsible for the following:

1. Compaction tests in accordance with ASTM D 698.
2. Field density tests for each two feet of lift; one test for each 5,000 square feet of fill.
3. Inspecting and testing stripped site, subgrades and proposed fill materials.

- C. The Contractor's duties relative to testing include:

1. Notifying the laboratory of conditions requiring testing.
2. Coordinating with the laboratory for field testing.
3. Providing representative fill soil samples to laboratory for test purposes. Provide 50 pound samples of each fill soil.
4. Paying costs for additional testing performed beyond the scope of that required and for retesting where initial tests reveals non-conformance with specified requirements.

- D. Inspection

1. Earthwork operations, suitability of excavated materials for fill and backfill, and placing and compaction of fill and backfill is subject to inspection. The Engineer will observe earthwork operations.
2. Foundations and shallow spread footing foundations are required to be inspected by a geotechnical engineer to verify suitable bearing and construction.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PREPARATION

- A. Maintain bench marks, monuments and other reference points. Re-establish, at no cost to the Owner, any such reference points if disturbed or destroyed.

3.2 CLEARING

- A. Clear areas required for access to site and execution of the work.
- B. Remove trees and shrubs within the area to be cleared.
- C. Clear undergrowth and deadwood, without disturbing subsoil.

3.3 DISPOSAL OF REFUSE

- A. The refuse resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the Contractor and shall be disposed of in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except by written consent of the property owner. In no case shall any material be left on the Project, shoved onto abutting private properties, or be buried in embankments or trenches on the Project.
- B. When approved in writing by the Engineer, and when authorized by the proper authorities, the Contractor may dispose of such refuse by burning on the site of the Project provided all requirements set forth by the authorities are met. The authorization to burn shall not relieve the Contractor in any way from damages which may result from Contractor's operations. On easements through private property, the Contractor shall not burn on the site.

END OF SECTION



SECTION 02140

Dewatering

PART 1 GENERAL

1.1 SCOPE

- A. This Section shall apply to all excavation, except trench excavation.
- B. Construct all permanent work in areas free from water. Design, construct and maintain all dikes, levees, cofferdams and diversion and drainage channels as necessary to maintain the areas free from water and to protect the areas to be occupied by permanent work from water damage. Remove temporary works after they have served their purpose.
- C. The Contractor shall be responsible for the stability of all temporary and permanent slopes, grades, foundations, materials and structures during the course of the Contract. Repair and replace all slopes, grades, foundations, materials and structures damaged by water, both surface and subsurface, to the lines, grades and conditions existing prior to the damage, at no additional cost to the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 CARE OF WATER

- A. Except where the excavated materials are designated as materials for permanent work, material from required excavation may be used for dikes, levees, cofferdams and other temporary backfill.
- B. Furnish, install, maintain and operate necessary pumping and other equipment for dewatering the various parts of the work and for maintaining the foundation and other parts free from water as required for constructing each part of the work.
- C. Install all drainage ditches, sumps and pumps to control excessive seepage on excavated slopes, to drain isolated zones with perched water tables and to drain impervious surfaces at final excavation elevation.
- D. Dewater by means which will insure dry excavations, preserve final lines and grades, do not disturb or displace adjacent soil.
- E. All pumping and drainage shall be done with no damage to property or structures and without interference with the rights of the public, owners of private property,

pedestrians, vehicular traffic or the work of other contractors, and in accordance with all pertinent laws, ordinances and regulations.

- F. Do not overload or obstruct existing drainage facilities.
- G. After they have served their purpose, remove all temporary protective work at a satisfactory time and in a satisfactory manner. All diversion channels and other temporary excavations in areas where the compacted fill or other structures will be constructed shall be cleaned out, backfilled and processed under the same Specifications as those governing the compacted fill.
- H. When the temporary works will not adversely affect any item of permanent work or the planned usage of the Project, the Contractor may be permitted to leave such temporary works in place. In such instances, breaching of dikes, levees and cofferdams may be required.

3.2 DEWATERING

- A. By the use of well points, pumps, tile drains or other approved methods, the Contractor shall prevent the accumulation of water in excavated areas. Should water accumulate, it shall be promptly removed.
- B. Excavations shall be continuously dewatered to maintain a ground water level no higher than three to four feet below the lowest point in the excavation. Dewatering shall be accomplished well enough in advance of excavation to ensure that groundwater is already lowered prior to completing the final excavation to finish subgrade.
- C. All destabilized subgrade conditions caused by inadequate or untimely dewatering operations shall be undercut and backfilled with suitable backfill material at no additional cost to the Owner.
- D. Piezometric observation wells are required to monitor the ground water level to insure proper dewatering prior to excavation below the static water table. The number of wells required will vary depending on the size and depth of structures.

END OF SECTION

SECTION 02200
Earthwork

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. Extent of earthwork is indicated on the Drawings.
 - 1. Preparation of subgrade for tanks, basins, building slabs, walks, and pavements is included as part of this work.
 - 2. Engineered fill course for support of building or basin slabs is included as part of this work.
 - 3. Backfilling of tanks, basins, basements, and trenches within building lines is included as part of this work.
- B. Excavation for Mechanical/Electrical Work: Excavation and backfill required in conjunction with underground mechanical and electrical utilities, and buried mechanical and electrical appurtenances is included as work of this Section.
- C. Definition: "Excavation" consists or removal of all material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

1.2 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Testing and Inspection Services: Employ, at Contractor's expense, testing laboratory acceptable to the Owner to perform soil testing and inspection service for quality control testing during earthwork operations.

1.3 SUBMITTALS

- A. Test Reports-Excavating

Submit following reports directly to the Engineer from the testing services, with copy to Contractor:

- 1. Test reports on borrow material.
- 2. Verification of each footing subgrade.
- 3. Field density test reports.

4. One optimum moisture-maximum density curve for each type of soil encountered.
5. Report of actual unconfined compressive strength and/or results of bearing tests on each strata tested.

1.4 JOB CONDITIONS

A. Site Information

1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil bearings. It is expressly understood that Owner will not be responsible for interpretation or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor.
2. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

B. Existing Utilities: Prior to commencement of work, the Contractor shall locate existing underground utilities in areas of the work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

C. Use of Explosives: The Contractor (or any of his subcontractors) shall not bring explosives onto site or use in work without prior written permission from the Owner. All activities involving explosives shall be in compliance with the rules and regulations of the Kentucky Department of Mines and Minerals, Division of Explosives and Blasting. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

D. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning lights.
 - a. Operate warning lights as recommended by authorities having jurisdiction.
 - b. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Definitions

1. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, SP, GC, SC, ML and CL.
2. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups MH, CH, OL, OH and PT.
3. Subbase Material: Naturally and artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.
4. Drainage fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing a 1-1/2 inch sieve and not more than 5 percent passing a No. 4 sieve.
5. Backfill and fill materials: Satisfactory soil materials free of debris, waste, frozen materials, vegetable, and other deleterious matter.
6. Engineered fill: (Refer to this Section, paragraph 3.7 A.1.)

PART 3 EXECUTION

3.1 STRIPPING AND TOPSOILING

- A. Before excavation and grading is commenced for buildings, structures or other work described hereinafter (except pipelines and manholes), the material meeting the topsoil specification of these Specifications shall be removed from the areas affected and stock-piled. When final grading is accomplished, particularly around buildings and other structures, the topsoil shall be spread evenly over the excavated area. Rough grading above excavated areas shall have been carried approximately 6 inches below finished grade (except solid rock, where it shall be carried 12 inches below finished grade) and brought back up to grade with topsoil as set out herein.

3.2 EXCAVATION

- A. Excavation includes excavation to subgrade elevations indicated including excavation of earth, rock, bricks, wood, cinders, and other debris. All excavation of materials in the lump sum portion of the work will be unclassified and no additional payment will be made regardless of type material encountered.
- B. Excavation Classifications (Not Used)
- C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.
 - 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to the Engineer.
 - 2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classifications.
- D. Additional Excavation
 - 1. When excavation has reached required subgrade elevations, notify the Engineer who will make an inspection of conditions.
 - a. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed in writing by the Engineer.
 - b. Removal of unsuitable material and its replacement as directed will be paid on basis of Contract conditions relative to changes in work.
- E. Stability of Excavations
 - 1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
 - 2. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- F. Shoring and Bracing

1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross-braces, in good serviceable condition.
 - a. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
 - b. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
 - c. Provide permanent steel sheet piling or pressure creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops as required and leave permanently in place. In the event the Owner directs the Contractor to leave shoring materials in place, the Owner will reimburse the Contractor for the reasonable cost of leaving such materials in place.
- G. Dewatering: Refer to this Division, Section 02140 for dewatering requirements.
- H. Material Storage
 1. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
 - a. Dispose of excess soil material and waste materials as herein specified.
- I. Excavation for Structures
 1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
 2. In excavating for footings and foundations, take care not to disturb bottom of excavation. All loose material shall be removed from the excavation just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.
- J. Excavation for Pavements

1. Cut surface under pavements to comply with cross-sections, elevations, and grades as shown.

K. Trench Excavation

1. The Contractor shall include in his lump sum bid all trenching and backfill necessary for installation of all pipelines as planned and specified. Trenching shall include clearing and grubbing of all trash, weeds, briars, trees, stumps encountered in trenching. The Contractor shall dispose of such material at no extra cost to the Owner. Shrubs shall be removed, maintained and replanted in the same or adjacent location as the Engineer may direct. Trenching also included such items as railroad, street, road, sidewalk, pipe, and small creek crossings; cutting, moving or repairing damage to fences, posts, gates, and other surface structures regardless of whether shown on the Drawings.
2. All existing facilities shall be protected from danger or damage while pipelines are being constructed and backfilled, and from damage due to settlement of the backfill.
3. In the event any existing structure is damaged, repair and restoration shall be made at once and backfill shall not be replaced until this is done. Restoration and repair shall be such that the damaged structure is equal to or better than its original condition and can serve its purpose as completely as before. All such restoration and repair shall be done without extra cost to the Owner.
4. Trenches must be dug to lines and grades shown on the Drawings. Hand trenching may be required in areas where machine trenching would result in undue damage to existing structures and facilities.
5. Excavation shall be open trenches, except where otherwise shown on the Drawings, for tunneling, boring, or jacking under structures, railroad, sidewalks and roads.
6. Sheeting and shoring of trenches shall be provided at the expense of the Contractor where necessary to protect life, property and the new or existing structures from damage or to maintain maximum permissible trench widths at top of pipe. All necessary materials, including, but not limited to, sheeting, sheet piling, trench jacks, braces, shores and stringers, shall be used to hold trench walls. Sheeting and shoring may be withdrawn as the trenches are being backfilled, after backfill has been tamped over top of the pipe at least 18 inches. If removal before backfill is completed to surface endangers adjacent structures, such as buildings, pipelines, street paving, and sidewalks, then the sheeting and shoring shall be left in place until such danger has passed, and then pulled if practical. Voids caused by sheeting

withdrawal shall be backfilled and tamped. If not withdrawn, sheeting shall be cut off at least 18 inches below final surface grade, so there is no obstruction at the ground level. In the event the Owner directs the Contractor to leave shoring materials in place, the Owner will reimburse the Contractor for the reasonable cost of leaving such materials in place.

7. Where subgrade of trench has insufficient stability to support the pipeline and hold it to its original grade, the Engineer may order stabilization by various means. Exclusive of dewatering normally required for construction, and instability caused by neglect of the Contractor, the necessary stabilization shall be paid for at unit prices established in the Contract. In the event no particular bid price is applicable, then the payment for stabilization will be negotiated.
8. The location of the pipelines and their appurtenances as shown are those intended for the final construction. However, conditions may present themselves before construction on any line is started that would indicate desirable changes in location. The Owner reserves the right to make reasonable changes in line and structure locations without extra cost, except as may be determined by extra units of materials and construction actually involved. The Owner is under no obligation to locate pipelines, so they may be excavated by machine.
9. Tunneling may be used at the Contractor's option as an alternate to open-cut trenching, at no extra cost to the Owner. The annular space between plates and excavation shall be either permanently placed pea gravel or sand, pumped grout (3 parts sand and 1 part Portland cement by volume) or other suitably installed material approved by the Engineer. Backfilling shall be kept close to the heading and completed after each day's work. Where grout is used for backfill, injection holes with threaded plugs shall be provided in linear plates at various levels and in sufficient number of effectively grout to void around the tunnel. A minimum of 3 grout holes shall be provided in each 8 feet of tunnel length. Grout shall be injected in the lower holes first, proceeding upward as the void is filled. Plugs shall be installed after each hole is filled and grout stops shall be provided behind plates as necessary to ensure complete filling of the void. In tunneling under buildings, the Contractor will be responsible for all damage resulting from his operations and methods of excavation and backfilling. Boring may also be used at the Contractor's option as an alternate to tunneling or open-cut trenching, at no extra cost to the Owner.
10. Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.

- a. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.
- b. Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6-inch layer of crushed stone or gravel prior to installation of pipe.
- c. For pipes or conduit 3 inches or less in nominal size and for flat-bottomed, multiple-duct conduit units, excavate to subbase depth indicated or, if not indicated, then to 4 inches below bottom of work to be supported.
- d. For pipes or conduit 6 inches or larger in nominal size, tanks, and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated or, if not otherwise indicated, to 6 inches below bottom of work to be supported.
- e. Except as otherwise indicated, excavation for exterior water-bearing piping (water, steam, condensate, drainage) so top of piping is no less than 3 feet 0 inches below finish grade.
- f. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
- g. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.
- h. Concrete is specified in Division 3.
- i. Do not backfill trenches until tests and inspections have been made and backfilling authorized by the Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
- j. For piping or conduit less than 3 feet 0 inches below surface of roadways, furnish and install steel casing pipe, minimum wall thickness of 1/4", or sufficient diameter to carry the pipe or conduit to at least two feet beyond outside edge of pavement.

L. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F (1°C).

3.3 COMPACTION

A. General

1. Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.
 - a. Percentage of maximum density requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D698 and not less than the following percentages of relative density, determined in accordance ASTM D4253 and D4254, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).
 - b. Structures, building slabs and steps, pavements: Compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent standard proctor density.
 - c. Lawn or unpaved areas: Compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent standard proctor density.
 - d. Walkways: Compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent standard proctor density.

B. Moisture Control

1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface or subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.4 BACKFILL AND FILL

A. General

1. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below. Backfill material shall be no larger than the specified depth of the layer to be placed and/or compacted.
 - a. In excavations, use satisfactory excavated or borrow material.
 - b. Under grassed areas, use satisfactory excavated or borrow material.
 - c. Under walks and pavements, use subbase material, or satisfactory excavated or borrow material, or combination of both.
 - d. Under steps, use subbase material.
 - e. Under building slabs, use subbase material for a minimum depth of 6 inches.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damproofing, waterproofing, and perimeter insulation.
2. Inspection, testing, approval, and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
5. Removal of trash and debris.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Ground Surface Preparation

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow,

strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

2. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.

D. Placement and Compaction

1. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers. Crushed stone shall be installed in accordance with Section 02255.
 - a. Before compaction, add moisture or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - b. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Backfilling Trenches

1. Backfilling shall be accomplished as soon as practical after pipe has been laid and jointing and alignment approved. Packing of crushed rock between joints shall be the usual procedure as the laying progresses. This is in order to avoid danger of misalignment from slides, flooding or other causes. The Engineer shall be given a maximum of 24 hours for inspection before backfilling.
2. Any special requirements of the Railroad Company or Highway Department in regard to backfilling will take precedence over the following general Specifications.
3. The backfill over the pipe shall be in accordance with the standard details shown on the Drawings for bedding and backfilling pipe.

4. In case maximum permissible trench widths (as designated by the pipe manufacturer) are exceeded, the Contractor shall furnish crushed rock backfill to a minimum of 12 inches over the top of pipe at no extra cost to the Owner.
5. After the foregoing cover requirements over top of the pipe have been met, rock may be used in the backfill in pieces no larger than 12 inches in any dimension and to an extent not greater than one-half the backfilling materials used. If additional earth is required for backfilling, it must be obtained and placed by the Contractor. Filling with rock and earth shall proceed simultaneously, such that no voids are left in the rock. After cover requirements over top of pipe have been met, backfilling may be employed without tamping, provided caution is used in quantity per dump and uniformity of level of backfilling. Surplus material shall be uniformly ridged over trench and excess rock hauled away, with no rock over 1-1/2 inch diameter in the top 6 inches. Ridged backfill shall be confined to the width of the trench and no higher than needed for replacement of settlement of backfill.
6. In the case of street, highway, railroad, sidewalk and driveway crossings; or within any roadway paving; or about manholes, valve and meter boxes; the backfill must be mechanically tamped in not over 6 inch layers, measured loose. Alternate method of compacting backfill shall be used, if refill material is in large hard lumps (crushed rock excepted) which cannot be consolidated without leaving voids.
7. In the case of tunnels, the annular space between plates and excavation shall be either permanently placed pea gravel or sand, pump grout (3 parts sand and 1 part Portland cement by volume) or other suitably installed material approved by the Engineer. Backfilling shall be kept close to the heading and completed after each day's work. Where grout is used for backfill, injection holes with threaded plugs shall be provided in liner plates at various levels and in sufficient number to effectively grout the void around the tunnel. A minimum of 3 grout holes shall be provided in each 8 feet of tunnel length. Grout shall be injected in the lower holes first, proceeding upward as the void is filled. Plugs shall be installed after each hole is filled and grout stops shall be provided behind plates as necessary to ensure complete filling of the void.
8. Where traffic on streets, driveways, railroads, sidewalks and highways requires temporary surfacing, backfilling shall be terminated 4 inches below original ground level and 4 inches to 6 inches of dense graded aggregate shall be placed on the trench. Backfills shall be maintained easily passible to traffic at original ground level, until acceptance of project or replacement of paving or sidewalks.

9. The Contractor shall protect all sewer, gas, electric, telephone, water and drain pipes or conduits from damage while pipelines are being constructed and backfilled, and from danger due to settlement of trench backfill.
10. No extra pavement shall be made for backfilling of any kind, except as specified hereinbefore. Backfilling shall be included as a part of the lump sum bid. No extra payment will be made to the Contractor for supplying outside materials for backfill.
11. On completion of the project, all backfills shall be dressed; holes filled; and surplus material hauled away. All permanent walks, street paving, roadway, etc., shall be restored and seeding and sodding performed as required.

3.5 GRADING

A. General

1. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Building Lines

1. All materials used for backfill around structures shall be of a quality acceptable to the Engineer and shall be free from large or frozen lumps, wood and other extraneous material. All spaces excavated and not occupied by footings, foundations walls or other permanent work shall be refilled with earth up to the surface of the surrounding ground, unless otherwise specified, with sufficient allowance for settlement. In making the fills and terraces around the structures, the fill shall be placed in layers not exceeding 12 inches in depth and shall be kept smooth as the work progresses. Each layer of the fill shall be rolled with an approved type roller and/or be compacted. When it is not practicable to compact sections of the fill immediately adjacent to buildings or structures by rolling, then such section shall be thoroughly compacted by means of mechanical tamping or hand tamping as may be required by the conditions encountered. All fills shall be placed so as to load structures symmetrically.
2. As set out hereinbefore, rough grading shall be held below finished grade and then the topsoil which has been stockpiled shall be evenly spread over the surface. The grading shall be brought to the levels shown on the

Drawings or to the elevations established by the Engineer. Final dressing shall be accomplished by hand work or machine work, or a combination of these methods as may be necessary to produce a uniform and smooth finish to all parts of the regrade. The surface shall be free from clods greater than 2 inches in diameter. Excavated rock may be placed in the fills, but it shall be thoroughly covered. Rock placed in fills shall not be closer than 12 inches from finished grade.

3. Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

a. Finish surfaces free from irregular surface changes, and as follows:

(1) Lawn or unpaved areas: Finish areas to receive topsoil to within not more than 0.10 ft. above or below required subgrade elevations.

(2) Walks: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.0 inch above or 1.0 inch below required subgrade elevation.

(3) Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 0.0 inch above or 1 inch below required subgrade elevation.

C. *Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 0.0 inch above or 1 inch below required subgrade elevation when tested with a 10 ft. straightedge.*

D. *Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or standard proctor density for each area classification.*

3.6 PAVEMENT SUBBASE COURSE

A. General

1. Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.

2. See other Division 2 sections for paving specifications.

-
- B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
 - C. Shoulders
 - 1. Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12 inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.
 - D. Placing
 - 1. Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
 - 2. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.7 BUILDING SLAB ENGINEERED FILL COURSE

- A. General
 - 1. Engineered fill course consists of placement of crushed stone, size and type shown on drawings, in layers of indicated thickness, over subgrade surface to support concrete building slabs.
- B. Placing
 - 1. Place fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.
 - 2. When a compacted course is shown to be 6 inches or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.8 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction

1. Allow testing service to inspect and report to the Engineer on findings and approve subgrades and fill layers before further construction work is performed.
 - a. Perform field density tests in accordance with ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2992 (nuclear density method), as applicable.
 - b. Footing subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Engineer.
 - c. Paved areas and building slab subgrade: Make at least one field density test of subgrade for every 2,000 square feet of paved area or building slab, but in no case less than three tests. In each compacted fill layer, make one field density test for every 2,000 square feet of overlaying building slab or paved area, but in no case less than three tests.
 - d. Foundation wall backfill: Take at least two field density tests, at locations and elevations as directed.

- B. If in opinion of the Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

3.9 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

- C. **Settling:** Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION



SECTION 02255
Crushed Stone and Dense Graded Aggregate

PART 1 GENERAL

1.1 SCOPE

- A. Furnish and install crushed stone for miscellaneous uses as shown on the Drawings, as called for in the Specifications.
- B. Sizes, types, and quality of crushed stone are specified in this Section, but its use for replacement of unsuitable material, pavement base, and similar uses is specified in detail elsewhere in the Specifications. The Engineer may order the use of crushed stone for purposes other than those specified in other sections, if, in his opinion, such use is advisable. Payment for same will be subject to negotiation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. When referred to in these Specifications, crushed stone shall be Number 57 graded in accordance with the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Latest Edition, unless otherwise noted.
- B. When referred to in these Specifications, dense graded aggregate (DGA) shall be crushed stone classified by the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Latest Edition, and conforming to the following requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
1 inch	100
3/4 inch	70-100
3/8 inch	50-80
#4	35-65
#10	25-50
#40	15-30
#200	5-12

PART 3 EXECUTION

3.1 INSTALLATION

- A. Crushed stone shall be placed in uniform layers not greater than 6 inches deep and shaped by power equipment to required lines, grades, cross sections, and depths. No minimum compacted density, method of compaction, or compaction equipment is required since a nominal amount of compaction effort with vibration can establish the desired intergranular locking of the aggregate under controlled placement depth. Acceptable compaction can be achieved with pneumatic-tired and tracked equipment and rollers.
- B. All compaction operation shall be performed to the satisfaction of the Engineer.
- C. Crushed stone shall be placed in those areas as shown on the Drawings and as may be directed by the Engineer.

END OF SECTION

SECTION 02665
Water Mains and Accessories

PART 1 GENERAL

1.01 SCOPE

- A. This Section describes products to be incorporated into the water mains and requirements for the installation and use of these items. Furnish all products and perform all labor necessary to fulfill the requirements of these Specifications.
- B. General: Supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable.

1.02 QUALIFICATIONS

If requested by the Engineer, submit evidence that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two years.

1.03 SUBMITTALS

Complete shop drawings and engineering data for all products shall be submitted to the Engineer in accordance with the requirements of Section 01340 of these Specifications.

1.04 TRANSPORTATION AND HANDLING

- A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against the pipe on the ground.
- B. Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front end loader. Do not use material damaged in handling. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe.

1.05 OWNER FURNISHED MATERIALS (Not Used)**1.06 STORAGE AND PROTECTION**

- A. Store all pipe which cannot be distributed along the route. Contractor shall make arrangements for the use of suitable storage areas.
- B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.
- C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipe in adjacent tiers.
- D. Stored mechanical and push-on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.
- E. Mechanical-joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

1.07 QUALITY ASSURANCE

The manufacturer shall provide written certification to the Engineer that all products furnished comply with all applicable requirements of these Specifications.

PART 2 PRODUCTS**2.01 PIPING MATERIALS AND ACCESSORIES**

- A. Ductile Iron Pipe (DIP)
 - 1. Ductile iron pipe shall be manufactured in accordance with AWWA C151. All pipe, except specials, shall be furnished in nominal lengths of 18 to 20 feet. Sizes will be as shown on the Drawings. All pipe shall have a minimum pressure rating as indicated in the following table, and corresponding minimum wall thickness, unless otherwise specified or shown on the Drawings:

Pipe Sizes (inches)	Pressure Class (psi)
4 - 12	350
14 - 18	250
20	250
24	200
30 - 54	250
60 - 64	200

2. Flanged pipe minimum wall thickness shall be equal to Special Class 53. Flanges shall be furnished by the pipe manufacturer.
3. Pipe and fittings shall be cement lined in accordance with AWWA C104. Pipe and fittings shall be furnished with a bituminous outside coating.
4. Fittings shall be ductile iron and shall conform to AWWA C110 or AWWA C153 with a minimum rated working pressure of 250 psi or as indicated on plans.
5. Joints
 - a. Unless shown or specified otherwise, joints shall be push-on or restrained joint type for pipe and standard mechanical, push-on or restrained joints for fittings. Push-on and mechanical joints shall conform to AWWA C111. Restrained joints for pipe and fittings shall be American "FLEX-RING" or "LOK-RING", Clow "SUPER-LOCK", or U.S. Pipe "TR FLEX". No field welding of restrained joint pipe will be permitted. No mega lug type restraints are allowed on 24" and 30" water line.
 - b. Restrained joint pipe (RJP) on supports shall have bolted joints and shall be specifically designed for clear spans of at least 36 feet.
 - c. Flanged joints shall meet the requirements of ANSI B16.1, Class 125.
6. Provide the appropriate gaskets for mechanical and flange joints. Gaskets for flange joints shall be made of 1/8-inch thick, cloth reinforced rubber; gaskets may be ring type or full face type.
7. Provide the necessary bolts for mechanical, restrained and flange connections. Bolts for flange connections shall be steel with American

Regular unfinished square or hexagon heads. Nuts shall be steel with American Standard Regular hexagonal dimensions, all as specified in ANSI B17.2. All bolts and all nuts shall be threaded in accordance with ANSI B1.1, Coarse Thread Series, Class 2A and 2B fit. Mechanical joint glands shall be ductile iron.

8. Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

B. Polyvinyl Chloride Pipe (PVC) - (SDR-21)

1. All PVC pipe shall have belled ends for push-on type jointing and shall conform to ASTM D 2241. The pipe shall have a Standard Dimension Ratio (SDR) of 21 and shall be capable of withstanding a working pressure of 200 psi. Pipe shall be supplied in minimum lengths of 20 feet.
2. All fittings shall be of cast or ductile iron meeting the requirements of AWWA C110 or AWWA C153 with a minimum rated working pressure of 150 psi. Fittings shall be cement lined in accordance with AWWA C104. Fittings shall be furnished with a bituminous outside coating. Special adapters shall be provided as recommended by the manufacturer to adapt the PVC pipe to mechanical jointing with cast or ductile iron pipe, fittings, or valves.
3. Detection tape shall be provided over all PVC water mains.
4. Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards, including the National Sanitation Foundation. Additionally, each piece of pipe shall be stamped "NSF Approved".

C. Polyvinyl Chloride Pipe (PVC) - (C-900)

1. All PVC pipe shall have belled ends for push-on type jointing and shall conform to AWWA C900, ductile iron pipe equivalent outside diameters. The pipe shall have a Dimension Ratio (DR) of 14 and shall be capable of withstanding a working pressure of 200 psi. Pipe shall be supplied in minimum lengths of 20 feet.
2. All fittings shall be of cast or ductile iron meeting the requirements of AWWA C110 or AWWA C153 with a minimum rated working pressure of

250 psi. Fittings shall be cement lined in accordance with AWWA C104. Fittings shall be furnished with a bituminous outside coating. Special adapters shall be provided, as recommended by the manufacturer, to adapt the PVC pipe to mechanical jointing with cast or ductile iron pipe, fittings or valves.

3. Detection tape shall be provided over all PVC water mains.
4. Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards, including the National Sanitation Foundation. Additionally, each piece of pipe shall be stamped "NSF Approved".

2.02 VALVES

A. Gate Valves (GV)

1. 3-Inches in Diameter and Smaller: Gate valves shall be bronze, heavy duty, rising stem, wedge type with screwed or union bonnet. Valve ends shall be threaded or solder type as appropriate. Valves shall have a minimum 200 psi working pressure for water (125 psi working pressure for steam). Valves shall be made in the U.S.A. Gate valves shall be equal to Crane No. 428 (threaded) or Crane No. 1334 (solder end).
2. 4-Inches Through 12-Inches in Diameter: Gate valves 4-inches through 12-inches shall be resilient wedge type conforming to the requirements of AWWA C509 rated for 200 psi working pressure.
 - a. Valves shall be provided with two O-ring stem seals with one O-ring located above and one O-ring below the stem collar. The area between the O-rings shall be filled with lubricant to provide lubrication to the thrust collar bearing surfaces each time the valve is operated. At least one anti-friction washer shall be utilized to further minimize operating torque. All seals between valve parts, such as body and bonnet, bonnet and bonnet cover, shall be flat gaskets or O-rings.
 - b. The valve gate shall be made of cast iron having a vulcanized, synthetic rubber coating, or a seat ring attached to the disc with retaining screws. Sliding of the rubber on the seating surfaces to compress the rubber will not be allowed. The design shall be such that compression-set of the rubber shall not affect the ability of the

valve to seal when pressure is applied to either side of the gate. The sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

- c. All internal ferrous surfaces shall be coated with epoxy to a minimum thickness of 4 mils. The epoxy shall be non-toxic, impart no taste to the water and shall conform to AWWA C550, latest revision.
- d. Gate valves 4 through 12-inches shall be manufactured by American-Darling, Mueller or M & H Valve.

B. Butterfly Valves (BV)

1. Butterfly valves shall be resilient seated; short body design, and shall be designed, manufactured, and tested in accordance with all requirements of AWWA C504, and as modified below. Valves shall be designed for a rated working pressure of 250 psi. Class B, AWWA C504 Section 5.2 testing requirements are modified as follows:
 - a. the leakage test shall be performed at a pressure of 250 psi;
 - b. the hydrostatic test shall be performed at a pressure of 500 psi; and
 - c. proof of design tests shall be performed and certification of such proof of design test shall be provided to the Engineer.
2. Valve bodies shall be ductile iron conforming to ASTM A 536, Grade 65-45-12 or ASTM A 126, Grade B cast iron. Shafts and shaft hardware shall be ASTM A 564, Type 630 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A 536, Grade 65-45-12. The resilient valve seat shall be located either on the valve disc or in the valve body and shall be fully field adjustable and field replaceable.
3. Valves shall be installed with the valve shafts horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.
4. Actuators
 - a. Valves shall be equipped with traveling nut, self-locking type actuators designed, manufactured and tested in accordance with AWWA C504. Actuators shall be capable of holding the disc in any position between full open and full closed without any movement or fluttering of the disc.

- b. Actuators shall be furnished with fully adjustable mechanical stop-limiting devices. Actuators that utilize the sides of the actuator housing to limit disc travel are unacceptable.
 - c. Valve actuators shall be capable of withstanding a minimum of 450 foot pounds of input torque in either the open or closed position without damage.
5. Operators: Valves for buried service shall have a nut type operator and shall be equipped with a valve box and stem extension, as required.
 6. Valve ends shall be mechanical joint type, except where flanged or restrained joint ends are shown. Flange joints shall meet the requirements of ANSI B16.1, Class 125. MJ Joint ends shall be restrained were called for using American MJ coupled joint or approved equal.
 7. Butterfly valves shall be manufactured by Mueller, M & H Valve, DeZurik, or Pratt.

2.03 FIRE HYDRANTS (FH)

- A. All fire hydrants shall conform to the requirements of AWWA C502 for 250 psi working pressure. Hydrants shall be the compression type, closing with line pressure. The valve opening shall not be less than [5-1/4-inches].
- B. In the event of a traffic accident, the hydrant barrel shall break away from the standpipe at a point above grade and in a manner which will prevent damage to the barrel and stem, preclude opening of the valve, and permit rapid and inexpensive restoration without digging or cutting off the water.
- C. The means for attaching the barrel to the standpipe shall permit facing the hydrant a minimum of eight different directions.
- D. Hydrants shall be fully bronze mounted with all working parts of bronze. Valve seat ring shall be bronze and shall screw into a bronze retainer.
- E. All working parts, including the seat ring shall be removable through the top without disturbing the barrel of the hydrant.
- F. The operating nut shall match those on the existing hydrants. The operating threads shall be totally enclosed in an operating chamber, separated from the hydrant barrel by a rubber O-ring stem seal and lubricated by a grease or an oil reservoir.

- G. Hydrant shall be a non-freezing design and be provided with a simple, positive, and automatic drain which shall be fully closed whenever the main valve is opened.
- H. Hose and pumper connections shall be breech-locked, pinned, or threaded and pinned to seal them into the hydrant barrel. Each hydrant shall have two 2-1/2-inch hose connections and one 4-1/2-inch pumper connection, all with National Standard threads and each equipped with cap and non-kinking chain.
- I. Hydrants shall be furnished with a mechanical joint connection to the spigot of the 6-inch hydrant lead.
- J. Minimum depth of bury shall be 4.5 feet. Provide extension section where necessary for proper vertical installation and in accordance with manufacturer's recommendations.
- K. All outside surfaces of the barrel above grade shall be painted with enamel equal to Koppers Glamortex 501 in a color to be selected by the Owner.
- L. Hydrants shall be traffic model and shall be Mueller Super Centurion or approved equal.

2.04 VALVE BOXES (VB) AND EXTENSION STEMS

- A. All valves shall be equipped with valve boxes. The valve boxes shall be cast iron two-piece screw type with drop covers. Valve boxes shall have a 5.25-inch inside diameter. Valve box covers shall weigh a minimum of 13 pounds. The valve boxes shall be adjustable to 6-inches up or down from the nominal required cover over the pipe. Valve boxes shall be of sufficient length that bottom flange of the lower belled portion of the box is below the valve operating nut. Ductile or cast iron extensions shall be provided as necessary. Covers shall have "WATER VALVE" or "WATER" cast into them. Valve boxes shall be manufactured in the United States.
- B. All valves shall be furnished with extension stems, as necessary, to bring the operating nut to within 30-inches of the top of the valve box. Connection to the valve shall be with a wrench nut coupling and a set screw to secure the coupling to the valve's operating nut. The coupling and square wrench nut shall be welded to the extension stem. Extension stems shall be equal to Mueller A-26441 or M & H Valve Style 3801.

2.05 VALVE MARKERS (VM)

The Contractor shall provide a concrete valve marker as detailed on the Drawings for each valve installed. Valve markers shall be stamped "Water".

2.06 TAPPING SLEEVES AND VALVES (TS&V)

Tapping sleeves shall be cast or ductile iron of the split-sleeve, mechanical joint type. The Contractor shall be responsible for determining the outside diameter of the pipe to be connected to prior to ordering the sleeve. Valves shall be gate valves furnished in accordance with the specifications shown above, with flanged connection to the tapping sleeve and mechanical joint connection to the branch pipe. The tapping sleeve and valve shall be supplied by the valve manufacturer. Tapping sleeves shall be equal to American-Darling, Mueller or M & H Valve.

2.07 TAPPING SADDLES

Tapping saddles shall be ductile iron body type with O-ring gasket and alloy steel straps. Connection shall be flanged or mechanical joint as detailed on the Drawings. Tapping saddles shall be equal to ACIPCO A-10920.

2.08 CORPORATION COCKS AND CURB STOPS

Corporation cocks and curb stops shall be ground key type, shall be made of bronze conforming to ASTM B 61 or B 62, and shall be suitable for the working pressure of the system. Ends shall be suitable for flared tube compression type joint. Threaded ends for inlet and outlet of corporation cocks shall conform to AWWA C800; coupling nut for connection to flared copper tubing shall conform to ANSI B16.26. Corporation cocks and curb stops shall be manufactured by Mueller or Ford.

2.09 AIR VALVES

- A. Air Release Valves: Air release valves shall be one of the following types:
1. The air release valve shall automatically release air accumulations from the pipeline due to the action of the float. When the air valve body fills with air, the float falls freely from the orifice to allow the air to escape to the atmosphere. When all the air has been exhausted from the valve body, the float will be buoyed up to seat against the orifice and prevent water from

being exhausted from the valve. The valve body and cover shall be constructed of cast iron (ASTM A 126-B). A synthetic orifice button shall be affixed to the valve cover to provide a non-corrosive seat for the float. The float shall be constructed of stainless steel. A resilient, Buna-N seat shall be attached to the float for drop-tight closure. The float shall be free floating within the valve body. Valve orifice size shall be as shown on the Drawings.

2. The air release valve shall automatically release air accumulations from the pipeline due to the action of the float and lever mechanism. When the air valve body fills with air, the float falls. Through the leverage mechanism, this causes the resilient seat to open the orifice and allow the air to escape to the atmosphere. When all the air has been exhausted from the valve body, the float will be buoyed up. Through the leverage mechanism, this will cause the resilient seat to close the orifice, preventing water from being exhausted from the valve. The valve body and cover shall be constructed of cast iron (ASTM A 126-B). The float shall be constructed of stainless steel and attached to a stainless steel lever mechanism. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure. Valve orifice size shall be as shown on the Drawings.

B. **Air/Vacuum Valve:** The air/vacuum valve shall discharge large amounts of air as the pipeline fills and allow air to enter the pipeline as it drains or in the event of vacuum conditions. The valve shall operate by means of a non-collapsible stainless steel float which seals an orifice. As air enters the valve the float shall drop from the orifice and allow the air to escape. As water rises in the valve, the float will again seal the orifice. The valve will be of such design that the float cannot blow shut at any air velocity. All working parts shall be of stainless steel. The inside of the valve body shall be epoxy coated. Valve inlet size shall be as shown on the Drawings.

C. **Combination Air Valves:** Combination air valves shall combine the features of an air release valve and an air/vacuum valve and shall be of one of the following types:

1. Valve shall consist of an air/vacuum valve described in paragraph B. above, with an air release valve described in A. above tapped into its body. The valve shall be of two-piece body design with an isolation gate valve separating the two valves.
2. Valve shall be single body, double orifice, allowing large volumes of air to escape out the larger diameter air and vacuum orifice when filling a pipeline and closes watertight when the liquid enters the valve. During large orifice

closure, the smaller diameter air release orifice will open to allow small pockets of air to escape automatically and independently of the large orifice. The large air/vacuum orifice shall also allow large volumes of air to enter through the orifice during pipeline drainage to break the vacuum. The Buna-N seats must be fastened to the valve, without distortion, for drop-tight shut-off. The float shall be stainless steel. Valve sizes shall be as shown on the Drawings.

- D. Surge Check Valve: Where shown on the Drawings or specified, provide a surge check valve on the inlet of the air/vacuum valve. The surge check valve shall be normally open, spring loaded valve consisting of a body, seat and plug bolted to the inlet of the air/vacuum valve. The surge check shall operate on the interphase between the kinetic energy and relative velocity flows of air and water, allowing air to pass through but water shall close the surge check, reducing the rate of water flow by means of throttling orifices in the plug to prevent shock closure of the air/vacuum valve. The surge check orifices must be an adjustable type to suit operating conditions in the field.
- E. All air valves and accessories shall be supplied by a single manufacturer and shall be G.A. Industries, APCO, Crispin or Val-Matic.

2.10 METER SETTERS

The meter setter shall be a tandem coppersetter as shown on the standard detail drawings with 3/4" double purpose ends and be 15" high with padlock wing. It shall be all purpose, designed for 5/8" x 3/4" meter and be of sufficient height to raise meters above the bottom of the meter box. The meter setter shall be Ford, or equal. Meter setters shall have an inverted key inlet valve.

Setters shall be installed so that the meters are centered in the meter box.

The water service line shall be extended a minimum of 18" beyond the meter box on the customer end. The end of the extension shall be capped or plugged to prevent entry of foreign material until the connection is made.

2.11 WATER METERS

Water meter shall be cold water displacement type meeting all requirement of AWWA C700-77. The meter sizes shall be 5/8-inch x 3/4-inch meters for 3/4" service rated at a flow of 20 gpm and 1" meters for 1" service rated at a flow of 50 gpm. Meters shall be of frost-proof design and be rotating disk type. The meters shall be equipped with a straight-reading register recording in U.S. Gallons hermetically sealed to prevent fogging and with a removable corrosion resistant

strainer screen between the outer case and measuring chamber. Register shall be equipped with a device to afford capability for accurately testing each meter according to AWWA Standards. The body case shall have the manufacturer's serial number imprinted thereon and have raised markings to indicate the direction of flow.

2.12 HYDRANT TEES (Not Used)

2.13 ANCHOR COUPLINGS (Not Used)

2.14 VALVE KEYS

The Contractor shall provide to the Owner one valve key for every five valves provided, but no more than three and not less than one valve key. Valve keys shall be 72-inches long with a tee handle and a 2-inch square wrench nut. Valve keys shall be furnished by the valve manufacturer. Valve keys shall be equal to Mueller A-24610 or ACIPCO No. 1303.

2.15 CONCRETE

Concrete shall have a compressive strength of not less than 3000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. For job mixed concrete, submit the concrete mix design for approval by the Engineer. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

PART 3 EXECUTION

3.01 EXISTING UTILITIES AND OBSTRUCTIONS

- A. The Drawings indicate utilities or obstructions that are known to exist according to the best information available to the Owner. The Contractor shall call the agencies or departments that own and/or operate utilities in the vicinity of the construction work site at least 72 hours (three business days) prior to construction to verify the location of the existing utilities.
- B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.
 - 1. Provide the required notice to the utility owners and allow them to locate their facilities. Field utility locations are valid for only 10 days after original notice. The Contractor shall ensure, at the time of any excavation, that a valid utility location exists at the point of excavation.

2. Expose the facility, for a distance of at least 200 feet in advance of pipeline construction, to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.
3. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.
4. Maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The Contractor shall provide the Engineer an updated copy of the log bi-weekly, or more frequently if required.

C. Conflict with Existing Utilities

1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed water main does not permit safe installation of the water main by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or crossing facility. The Contractor may change the proposed alignment of the water main to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the Engineer. Where such relocation of the water main is denied by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.
2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed water main does not permit the crossing without immediate or potential future damage to the utility, main, service, or the water main. The Contractor may change the proposed grade of the water main to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the Engineer. Where such relocation of the water main is denied by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.

D. Electronic Locator: Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

E. Water and Sewer Separation

1. Water mains should maintain a minimum 10 foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the 10 foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of 18-inches above the top of the sewer. Should neither of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of 18-inches.
2. The water main, when installed below the sewer, shall be encased in concrete with a minimum 6-inch concrete depth to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.
3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

3.02 CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS

- A. Install pipe lines and appurtenances along highways, streets and roadways in accordance with the applicable regulations of, and permits issued by, the Department of Transportation, Mason and Fleming Counties and the City of Flemingsburg with reference to construction operations, safety, traffic control, road maintenance and repair.
- B. Traffic Control
 1. The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public.
 2. Construction traffic control devices and their installation shall be in accordance with the current Manual On Uniform Traffic Control Devices for Streets and Highways.
 3. Placement and removal of construction traffic control devices shall be coordinated with the Department of Transportation, Mason and Fleming Counties and the City of Flemingsburg a minimum of 48 hours in advance of the activity.
 4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street

right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead", shall be removed and replaced when needed.

5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.
6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of the Department of Transportation, Mason and Fleming Counties and the City of Flemingsburg. Sign panels shall be of durable materials capable of maintaining their color, reflective character and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current Manual On Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to insure that they are maintained in the proper position throughout their period of use.

C. Construction Operations

1. Perform all work along highways, streets and roadways to minimize interference with traffic.
2. Stripping: Where the pipe line is laid along road right-of-way, strip and stockpile all sod, topsoil and other material suitable for right-of-way restoration.

3. Trenching, Laying and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.
 4. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.
 5. Construction operations shall be limited to 400 feet along areas within KYDOT jurisdiction, including clean-up and utility exploration.
- D. Excavated Materials: Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement in a timely manner.
- E. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
- F. Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.
- G. Maintaining Highways, Streets, Roadways and Driveways
1. Maintain streets, highways, roadways and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work.
 2. During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.
 3. Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. The grader or front-end loader shall be available at all times.

4. Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the Work.

3.03 PIPE DISTRIBUTION

- A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.
- B. No pipe shall be strung further along the route than 1000 feet beyond the area in which the Contractor is actually working without written permission from the Owner.
- C. No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.
- D. No distributed pipe shall be placed inside drainage ditches.
- E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.

3.04 LOCATION AND GRADE

- A. The Drawings show the alignment of the water main and the location of valves, hydrants and other appurtenances.
- B. Construction Staking
 1. The base lines for locating the principal components of the work and a bench mark adjacent to the work are shown on the Drawings. Base lines shall be defined as the line to which the location of the water main is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or survey line. The Contractor shall be responsible for performing all survey work required for constructing the water main, including the establishment of base lines and any detail surveys needed for construction. This work shall include the staking out of permanent and temporary easements to insure that the Contractor is not deviating from the designated easements.
 2. The level of detail of survey required shall be that which the correct location of the water main can be established for construction and verified by the

Engineer. Where the location of components of the water main, e.g. tunnels and fittings, are not dimensioned, the establishment on the location of these components shall be based upon scaling these locations from the Drawings with relation to readily identifiable land marks, e.g., survey reference points, power poles, manholes, etc.

C. Reference Points

1. The Contractor shall take all precautions necessary, which includes, but is not necessarily limited to, installing reference points, in order to protect and preserve the centerline or baseline established by the Engineer.
2. Reference points shall be placed, at or no more than three feet, from the outside of the construction easement or right-of-way. The location of the reference points shall be recorded in a log with a copy provided to the Engineer for use, prior to verifying reference point locations. Distances between reference points and the manhole centerlines shall be accurately measured to 0.01 foot.
3. The Contractor shall give the Engineer reasonable notice that reference points are set. The reference point locations must be verified by the Engineer prior to commencing clearing and grubbing operations.

D. After the Contractor locates and marks the water main centerline or baseline, the Contractor shall perform clearing and grubbing.

E. Construction shall begin at a connection location and proceed without interruption. Multiple construction sites shall not be permitted without written authorization from the Engineer for each site.

F. The Contractor shall be responsible for any damage done to reference points, base lines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, base lines, center lines and temporary bench marks as a result of the operations.

3.05 LAYING AND JOINTING PIPE AND ACCESSORIES

A. Lay all pipe and fittings to accurately conform to the lines and grades established by the Engineer.

B. Pipe Installation

1. Proper implements, tools and facilities shall be provided for the safe performance of the Work. All pipe, fittings, valves and hydrants shall be lowered carefully into the trench by means of slings, ropes or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.
2. All pipe, fittings, valves, hydrants and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.
3. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe containing dirt shall be laid.
4. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.
5. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.
6. It is not mandatory to lay pipe with the bells facing the direction in which work is progressing.
7. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade, shall not be permitted.
8. Detection tape shall be buried 4 to 10-inches deep. Should detection tape need to be installed deeper, the Contractor shall provide 3-inch wide tape. In no case shall detection tape be buried greater than 20-inches from the finish grade surface.

C. Alignment and Gradient

1. Lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. Do not deflect any joint more than the maximum deflection recommended by the manufacturer.

2. Maintain a transit, level and accessories on the job to lay out angles and ensure that deflection allowances are not exceeded.
- D. Expediting of Work: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug, either push-on, mechanical joint, restrained joint or as approved by the Engineer.
- E. Joint Assembly
1. Push-on, mechanical, flange and restrained type joints shall be assembled in accordance with the manufacturer's recommendations.
 2. The Contractor shall inspect each pipe joint within 200 feet on either side of main line valves to insure 100 percent seating of the pipe spigot, except as noted otherwise.
 3. Each restrained joint shall be inspected by the Contractor to ensure that it has been "homed" 100 percent.
 4. The Contractor shall internally inspect each pipe joint to insure proper assembly for pipe 24-inches in diameter and larger after the pipe has been brought to final alignment.
- F. Cutting Pipe: Cut ductile iron pipe using an abrasive wheel saw. Cut PVC pipe using a suitable saw; remove all burrs and smooth the end before jointing. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.
- G. Polyethylene Encasement: Installation shall be in accordance with AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape and all damaged areas shall be completely repaired to the satisfaction of the Engineer.
- H. Valve and Fitting Installation
1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of

pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be corrected or held for inspection by the Engineer. Valves shall be closed before being installed.

2. Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in this Section for cleaning, laying and joining pipe, except that 12-inch and larger valves shall be provided with special support, such as treated timbers, crushed stone, concrete pads or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.
3. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads will bear on the base and not on the valve or pipe. Extension stems shall be installed where depth of bury places the operating nut in excess of 30-inches beneath finished grade so as to set the top of the operating nut 30-inches below finished grade. The valve box cover shall be flush with the surface of the finished area or such other level as directed by the Engineer.
4. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.
5. A valve marker shall be provided for each underground valve. Unless otherwise detailed on the Drawings or directed by the Engineer, valve markers shall be installed 6-inches inside the right-of-way or easement.

I. Hydrant Installation

1. Prior to installation, inspect all hydrants for direction of opening, nozzle threading, operating nut and cap nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and cracks. Defective hydrants shall be corrected or held for inspection by the Engineer.
2. All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the roadway, with pumper nozzle facing the roadway,

except that hydrants having two-hose nozzles 90 degrees apart shall be set with each nozzle facing the roadway at an angle of 45 degrees.

3. Hydrants shall be set to the established grade, with the centerline of the lowest nozzle at least 12-inches above the ground or as directed by the Engineer.
4. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve. When a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing coarse gravel or crushed stone mixed with coarse sand from the bottom of the trench to at least 6-inches above the drain port opening in the hydrant to a distance of 12-inches around the elbow.
5. When a hydrant is set in clay or other impervious soil, a drainage pit 2 x 2 x 2 feet shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand under and around the elbow of the hydrant and to a level of 6-inches above the drain port.
6. Hydrants shall be located as shown on the Drawings or as directed by the Engineer. In the case of hydrants that are intended to fail at the ground-line joint upon vehicle impact, specific care must be taken to provide adequate soil resistance to avoid transmitting shock moment to the lower barrel and inlet connection. In loose or poor load bearing soil, this may be accomplished by pouring a concrete collar approximately 6-inches thick to a diameter of 24-inches at or near the ground line around the hydrant barrel.

3.06 CONNECTIONS TO WATER MAINS

- A. Make connections to existing pipe lines with tapping sleeves and valves, unless specifically shown otherwise on the Drawings.
- B. Location: Before laying pipe, locate the points of connection to existing water mains and uncover as necessary for the Engineer to confirm the nature of the connection to be made.
- C. Interruption of Services: Make connections to existing water mains only when system operations permit. Operate existing valves only with the specific authorization and direct supervision of the Owner.
- D. Tapping Saddles and Tapping Sleeves

1. Holes in the new pipe shall be machine cut, either in the field or at the factory. No torch cutting of holes shall be permitted.
 2. Prior to attaching the saddle or sleeve, the pipe shall be thoroughly cleaned, utilizing a brush and rag, as required.
 3. Before performing field machine cut, the watertightness of the saddle or sleeve assembly shall be pressure tested. The interior of the assembly shall be filled with water. An air compressor shall be attached, which will induce a test pressure as specified in this Section. No leakage shall be permitted for a period of five minutes.
 4. After attaching the saddle or sleeve to an existing main, but prior to making the tap, the interior of the assembly shall be disinfected. All surfaces to be exposed to potable water shall be swabbed or sprayed with a one percent hypochlorite solution.
- E. Connections Using Solid Sleeves: Where connections are shown on the Drawings using solid sleeves, the Contractor shall furnish materials and labor necessary to make the connection to the existing pipe line.
- F. Connections Using Couplings: Where connections are shown on the Drawings using couplings, the Contractor shall furnish materials and labor necessary to make the connection to the existing pipe line, including all necessary cutting, plugging and backfill.

3.07 VALVE BOX ADJUSTMENT (Not Used)

3.08 THRUST RESTRAINT

- A. Provide restraint at all points where hydraulic thrust may develop.
- B. Concrete Blocking
1. Provide concrete blocking for all bends, tees, valves, and other points where thrust may develop, except where other exclusive means of thrust restraint are specifically shown on the Drawings.
 2. Concrete shall be as specified in this Section.
 3. Form and pour concrete blocking at fittings as shown on the Drawings and as directed by the Engineer. Pour blocking against undisturbed earth. Increase dimensions when required by over excavation.

3.09 INSPECTION AND TESTING**A. Pressure and Leakage Test**

1. All sections of the water main subject to internal pressure shall be pressure tested in accordance with AWWA C600. A section of main will be considered ready for testing after completion of all thrust restraint and backfilling.
2. Each segment of water main between main valves shall be tested individually.
3. Test Preparation
 - a. For water mains less than 24-inches in diameter, flush sections thoroughly at flow velocities, greater than 2.5 feet per second, adequate to remove debris from pipe and valve seats. For water mains 24-inches in diameter and larger, the main shall be carefully swept clean, and mopped if directed by the Engineer. Partially open valves to allow the water to flush the valve seat.
 - b. Partially operate valves and hydrants to clean out seats.
 - c. Provide temporary blocking, bulkheads, flanges and plugs as necessary, to assure all new pipe, valves and appurtenances will be pressure tested.
 - d. Before applying test pressure, air shall be completely expelled from the pipeline and all appurtenances. Insert corporation cocks at highpoints to expel air as main is filled with water as necessary to supplement automatic air valves. Corporation stops shall be constructed as detailed on the Drawings with a meter box.
 - e. Fill pipeline slowly with water. Provide a suitable pump with an accurate water meter to pump the line to the specified pressure.
 - f. The differential pressure across a valve or hydrant shall equal the maximum possible, but not exceed the rated working pressure. Where necessary, provide temporary backpressure to meet the differential pressure restrictions.
 - g. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure.
4. Test Pressure: Test the pipeline at 50 psi above the rated working pressure measured at the lowest point for at least two hours. Maintain the test pressure within 5 psi of the specified test pressure for the test duration. Should the pressure drop more than 5 psi at any time during the test period,

the pressure shall be restored to the specified test pressure. Provide an accurate pressure gage with graduation not greater than 5 psi.

5. Leakage

- a. Leakage shall be defined as the sum of the quantity of water that must be pumped into the test section, to maintain pressure within 5 psi of the specified test pressure for the test duration plus water required to return line to test pressure at the end of the test. Leakage shall be the total cumulative amount measured on a water meter.
- b. The Owner assumes no responsibility for leakage occurring through existing valves.

6. Test Results: No test section shall be accepted if the leakage exceeds the limits determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

Where:	L	=	allowable leakage, in gallons per hour
	S	=	length of pipe tested, in feet
	D	=	nominal diameter of the pipe, in inches
	P	=	average test pressure during the leakage test, in pounds per square inch (gauge)

As determined under Section 4 of AWWA C600.

If the water main section being tested contains lengths of various pipe diameters, the allowable leakage shall be the sum of the computed leakage for each diameter. The leakage test shall be repeated until the test section is accepted. All visible leaks shall be repaired regardless of leakage test results.

7. Completion: After a pipeline section has been accepted, relieve test pressure. Record type, size and location of all outlets on record drawings.

3.10 DISINFECTING PIPELINE

- A. After successfully pressure testing each pipeline section, disinfect in accordance with AWWA C651 for the continuous-feed method and these Specifications.
- B. Specialty Contractor: Disinfection shall be performed by an approved specialty contractor. Before disinfection is performed, the Contractor shall submit a written procedure for approval before being permitted to proceed with the disinfection. This plan shall also include the steps to be taken for the neutralization of the chlorinated water.

C. Chlorination

1. Apply chlorine solution to achieve a concentration of at least 50 milligrams per liter free chlorine in new line. Retain chlorinated water for 24 hours.
2. Chlorine concentration shall be recorded at every outlet along the line at the beginning and end of the 24 hour period.
3. After 24 hours, all samples of water shall contain at least 25 milligrams per liter free chlorine. Re-chlorinate if required results are not obtained on all samples.

D. **Disposal of Chlorinated Water:** Reduce chlorine residual of disinfection water to less than one milligram per liter if discharged directly to a body of water or to less than two milligrams per liter if discharged onto the ground prior to disposal. Treat water with sulfur dioxide or other reducing chemicals to neutralize chlorine residual. Flush all lines until residual is equal to existing system.

E. **Bacteriological Testing:** After final flushing and before the main is placed into service, the Contractor shall assist the Owner in collecting samples from the line to have tested for bacteriological quality. Testing shall be performed by the Owner at a laboratory certified by the State of Kentucky. Re-chlorinate lines until the required results are obtained.

3.11 PROTECTION AND RESTORATION OF WORK AREA

- A. **General:** Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.
1. The Contractor shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
 2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
 4. The Department of Transportation's engineer shall be authorized to stop all work by the Contractor when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.
- B. Man-Made Improvements: Protect, or remove and replace with the Engineer's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins and other improvements that may be encountered in the Work.
- C. Cultivated Growth: Do not disturb cultivated trees or shrubbery unless approved by the Engineer. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.
- D. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3-inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the Contractor. No stumps, wood piles, or trash piles will be permitted on the work site.
- E. Disposal of Rubbish: Dispose of all materials cleared and grubbed during the construction of the Project in accordance with the applicable codes and rules of the appropriate county, state and federal regulatory agencies.

3.12 ABANDONING EXISTING WATER MAINS (Not Used)

END OF SECTION



SECTION 02933

Seeding

PART 1 GENERAL

1.1 SCOPE

- A. The work covered by this section shall include the establishment of all ground cover including areas to be seeded and sodded. This work shall include the supply of all materials, labor, superintendence and maintenance as outlined in these specifications.
- B. The part of the site not covered by roads, walks, building, etc. shall be seeded according to these specifications. The areas to be sodded shall include a three foot strip immediately adjacent to all roads, walks, and structures, etc.

PART 2 PRODUCTS

2.1 LIME

- A. Agriculture lime shall be spread over the entire area to be planted at an average rate of one (1) ton per acre. One tillage operation shall incorporate both the lime and the fertilizer into the soil to a depth of four inches (4").

2.2 FERTILIZER

- A. Two fertilizer materials shall be applied to all areas to be seeded. The first shall be complete commercial fertilizer with 1:2:2 ratio of nitrogen, phosphorus, and potassium. Eight hundred pounds (800 lbs) per acre of a 6-12-12 fertilizer, or equivalent amount of another 1:2:2 ratio fertilizer shall be used.
- B. In addition to a complete fertilizer, a slowly available nitrogen fertilizer shall be applied. Two hundred fifty pounds (250 lbs.) per acre of urea formaldehyde (38-0-0) shall be used.
- C. Both fertilizer materials shall be free flowing and suitable for application with approved equipment. Each material shall conform to State fertilizer laws. Bagged fertilizer shall be delivered in sealed standard containers and shall bear the name, trademark, and warranty of the producer. The fertilizers shall be incorporated into the surface four inches (4") by tillage.

2.3 SEED

- A. Grass seed shall be fresh, clean and new crop seed composed of the following varieties mixed in the proportion by weight as shown and shall be certified as to varietal purity. All seed shall be mixed by a dealer furnished in sealed standard containers, and tagged with the dealer's guaranteed statement of composition of mixture and percentage of purity and germination. All areas disturbed by construction activity shall be seeded within the following blend at a rate of two hundred pounds (200 lbs.) per acre (4.6 pounds per 1000 square feet).
- B. The quality of seed shall conform to or exceed the minimum requirement for seed quality of the Kentucky Seed Improvement Association and shall meet or exceed the following standards for purity and germination:

Variety	Min% Purity/Germ	Wt.%	Seeding Rate Pounds Per Acre
Kentucky Bluegrass-Kenblue	98/80	20	40
Creeping Red Fescue-Pennlawn	98/85	70	140
Perennial Ryegrass	95/90	10	20

2.4 MULCH

- A. Mulch for hydroseeding shall be natural wood cellulose fiber or wood pulp which disperses readily in water and which has no toxic effect when combined with seed or other materials. It shall be a commercially available product made for use in spray applicators. Wood cellulose mulch shall be applied at a rate of 1000 lbs. per acre when work is done in the spring or fall season as defined below and 1500 pounds per acre when work is done during summer months.

2.5 SOD

- A. Sod shall be bluegrass sod strongly rooted and free of pernicious weeds. It shall be a uniform thickness of not more than 1 1/2" and shall have not less than 3/4" of soil. All sod shall be grown on a commercial turf farm and no pasture sod shall be acceptable. The source of the sod must be approved by the Engineer before it is cut for delivery.

PART 3 EXECUTION

3.1 PLANTING SEASON

- A. The normal seasonal dates for seeding mixtures containing Kentucky Bluegrass or tall fescue shall be August 15 to October 15 and from the time the soil is workable in the spring to May 1. Seeding of a specified grass variety at times other than the normal seasonal dates must be approved by the Engineer. Seeding shall not be done during windy weather or when the ground is excessively wet, frozen or otherwise untillable.

3.2 SOIL PREPARATION

- A. All areas shall be graded to surface drain as shown on the plans. The lime and fertilizer shall be applied at the rates specified above and tilled into the surface 4 inches with approved tillage equipment to provide a reasonably firm, but friable seedbed.
- B. All areas to be seeded or sodded shall meet the specified grades, and be free of any weed or undesirable plant growth or debris.
- C. Lime and fertilizer for all areas shall be applied at the rate specified and incorporated into the top four inches by approved tillage equipment. The seed and wood cellulose mulch shall then be mixed with adequate water to produce a slurry and then applied uniformly with a hydroseeder at the rates specified above. Any area inadequately covered shall be redone as directed by the Engineer.

3.3 MAINTENANCE OF SEEDED AREAS:

- A. The Contractor shall maintain seeded areas until they have been mowed two times and then he shall repair eroded areas one time after the second mowing. Each mowing shall be when the grass is about four inches (4") high and cut back to about 2 1/2". After the second mowing, the Contractor shall notify the Engineer that he is ready to repair erosion damage so that an inspection can be scheduled when the erosion repair work is complete. Once the erosion areas have been filled with topsoil, fertilized, seeded and mulched and the work has been inspected and approved by the Engineer, the work under this section is complete. Any further erosion repair work necessary will be treated as an extra and shall be done only when authorized by the Engineer.

3.4 CARE DURING CONSTRUCTION

- A. The Contractor shall be responsible for repair to turf areas damaged by his equipment or men until all work is accepted. Temporary haul roads and storage areas shall be tilled to depth of four inches (4") and fertilized, seeded and mulched as specified above.

END OF SECTION

SECTION 02957
Erosion Control and Stabilization

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes provisions for erosion control and stabilization.

PART 2 PRODUCTS

2.1 EROSION CONTROL

- A. All drainage paths and swales to be cut, graded, and seeded prior to any utilities trenching.
- B. All drainage paths and excavated areas to be mulched upon completion of seeding. Straw bales are to be staked perpendicular to flow in bottom of swale every 100 feet along drainage swale route. Straw bales to remain in swale route until a substantial growth of grass has been established. Straw bales are to be staked around all inlet rims where swale lines are excavated to route storm water flow into inlet.
- C. Erosion control requires immediate seeding and mulching of any stripped and unvegetated areas, including unpaved right-of-ways.

2.2 SEEDING

- A. A leguminous inoculated seed mixture shall be used for all seed areas. Class of seeding as follows:

1. Mixture A: shall be used for all drainage paths, swales, side slopes, and all other areas where existing lawn is disturbed during construction.

Seed mixture shall be as follows:

2 lbs./1000 sq. ft. - Chewings Fescue
2 lbs./1000 sq. ft. - Kentucky Bluegrass
2 lbs./1000 sq. ft. - Perennial Rye

Seed shall be sown at a rate of 6 lbs. per 1000 sq. ft. of area.

2. Mixture B: shall be for all areas disturbed by excavation and re-grading as seasonal or temporary cover in bare areas.

Seed mixture shall be as follows:

1 lb./1000 sq. ft. - Perennial Rye
1 lb./1000 sq. ft. - Annual Rye

Seed shall be sown at a rate of 4 lbs. per 1000 sq. ft. of area.

3. Mixture C: shall be used for all lake or pond banks.

Seed mixture shall be as follows:

20% Perennial Ryegrass
15% Kentucky Bluegrass
15% Creeping Red Fescue
50% Nutri-Kote plus Apron fungicide seed coating.

Seed shall be sown at a rate of 5 lbs. per 1000 sq. ft. of area.

2.3 FERTILIZER

- A. Apply a minimum of 600 lbs. of 12-12-12 fertilizer per acre.

2.4 MULCH

- A. Mulch shall consist of clean, seed-free threshed straw of wheat, rye, oats, or barley. Spread mulch uniformly to form a continuous blanket not less than 1.5 inches loose measurement over "Mixture A" and "Mixture C" seeded areas.
- B. The mulch shall be held in place by being mechanically crimped into the soil, tackified with a bio-degradable tackifier, or netted and stapled to the soil with degradable netting. The mulch should be applied at a minimum rate of 1500 lbs. per acre.

2.5 STRAW TACKIFIER - MULCH TACKIFIER

- A. The tackifier shall be a naturally derived product from all organic sources resulting in a strong resilient muciloid, non-bitumen M-Binder. The product can be used in a hydro-seeder with both 100% Virgin Wood Fiber or Paper Wood Cellulose mulch and can be sprayed on 100% Wheat Straw Mulch for stabilization from the wind. Application rates vary between 60-140 lbs. per acre depending upon the existing conditions. The product shall be packed in 40 lbs. fiber bags.

Technical Specifications:

Protein Content	1.62
Ash Content	2.7
Fiber	4.0
pH of 1% Solution	6.8
Settleable Solids	5.0

- B. Erosion control requires immediate seeding and mulching of any stripped and un-vegetated areas, including unpaved right-of-ways.

PART 3 (NOT USED)

END OF SECTION



SECTION 03300
Cast-in-place Concrete

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
 - 1. Foundations and footings.
 - 2. Slabs-on-grade.
 - 3. Fill for steel deck.
 - 4. Foundation walls.
 - 5. Shear walls.
 - 6. Load-bearing building walls.
 - 7. Building frame members.
 - 8. Equipment pads and bases.
 - 9. Fill for steel pan stairs.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.
- C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.
- D. Shop drawings for formwork indicating fabrication and erection of forms for specific

Cast-in-place Concrete

finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.

1. Engineer's review is for general applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.
- E. Samples of materials as requested by Engineer, including names, sources, and descriptions, as follows:
1. Color finishes.
 2. Normal weight aggregates.
 3. Fiber reinforcement.
 4. Reglets.
 5. Waterstops.
 6. Vapor retarder/barrier.
 7. Form liners.
- F. Laboratory test reports for concrete materials and mix design test.
- G. Material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- B. Concrete Testing Service: Engage a testing agency acceptable to Engineer to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration to match control sample. Provide solid backing and form supports to ensure stability of textured form liners.
- D. Forms for Cylindrical Columns and Supports: Metal, glass-fiber-reinforced plastic, or paper or fiber tubes that will produce smooth surfaces without joint indications. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.
- E. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to support weight of placed concrete without deformation.
- F. Carton Forms: Biodegradable paper surface, treated for moisture-resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- G. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- H. Form Ties: Factory-fabricated, adjustable-length, stainless steel, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches (38 mm) to the plane of the exposed concrete surface.
 - 1. Provide ties that, when removed, will leave holes not larger than 1 inch (25 mm) in diameter in the concrete surface. Use only stainless material.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615 Grade 60 (ASTM A 615M Grade 400), deformed.

Cast-in-place Concrete

- B. Galvanized Reinforcing Bars: ASTM A 767 (ASTM A 767M), Class II [2.0 oz. zinc psf (610 g/sq. m)], hot-dip galvanized after fabrication and bending.
- C. Epoxy-Coated Reinforcing Bars: ASTM A 775 (ASTM A 775M).
- D. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- E. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- F. Deformed-Steel Welded Wire Fabric: ASTM A 497.
- G. Epoxy-Coated Welded Wire Fabric: ASTM A 884, Class A.
- H. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Use one brand of cement throughout Project.
- B. Fly Ash: ASTM C 618, Type F.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
 - 2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer..
- D. Lightweight Aggregates: ASTM C 330.

-
- E. Water: Potable.
- F. Fiber Reinforcement: Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III, not less than 3/4 inch long.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Gilco Fibers, Cormix Construction Chemicals.
 - b. Durafiber, Durafiber Corp.
 - c. Fiberstrand 100, Euclid Chemical Co.
 - d. Fibermesh, Fibermesh Co., Div. Synthetic Industries, Inc.
 - e. Forta, Forta Corp.
 - f. Grace Fibers, W.R. Grace & Co.
 - g. Polystrand, Metalcrete Industries
- G. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- H. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Air-Tite, Cormix Construction Chemicals.
 - b. Air-Mix or Perma-Air, Euclid Chemical Co.
 - c. Darex AEA or Daravair, W.R. Grace & Co.
 - d. MB-VR or Micro-Air, Master Builders, Inc.
 - e. Sealtight AEA, W.R. Meadows, Inc.
 - f. Sika AER, Sika Corp.
- I. Water-Reducing Admixture: ASTM C 494, Type A.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Chemtard, ChemMasters Corp.
 - b. PSI N, Cormix Construction Chemicals.
 - c. Eucon WR-75, Euclid Chemical Co.
 - d. WRDA, W.R. Grace & Co.

Cast-in-place Concrete

- e. Pozzolith Normal or Polyheed, Master Builders, Inc.
- f. Metco W.R., Metalcrete Industries.
- g. Prokrete-N, Prokrete Industries.
- h. Plastocrete 161, Sika Corp.

J. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Super P, Anti-Hydro Co., Inc.
 - b. Cormix 200, Cormix Construction Chemicals.
 - c. Eucon 37, Euclid Chemical Co.
 - d. WRDA 19 or Daracem, W.R. Grace & Co.
 - e. Rheobuild or Polyheed, Master Builders, Inc.
 - f. Superslump, Metalcrete Industries.
 - g. PSPL, Prokrete Industries.
 - h. Sikament 300, Sika Corp.

K. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Q-Set, Conspec Marketing & Manufacturing Co.
 - b. Lubricon NCA, Cormix Construction Chemicals.
 - c. Accelguard 80, Euclid Chemical Co.
 - d. Daraset, W.R. Grace & Co.
 - e. Pozzutec 20, Master Builders, Inc.
 - f. Accel-Set, Metalcrete Industries.

L. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

- 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. PSI-R Plus, Cormix Construction Chemicals.
 - b. Eucon Retarder 75, Euclid Chemical Co.
 - c. Daratard-17, W.R. Grace & Co.
 - d. Pozzolith R, Master Builders, Inc.
 - e. Protard, Prokrete Industries.
 - f. Plastiment, Sika Corporation.

2.4 RELATED MATERIALS

- A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217- inch- (0.46-mm-) thick galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (0.76 mm) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.
- C. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
- D. Rubber Waterstops: Corps of Engineers CRD-C 513.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - a. The Burke Co.
 - b. Progress Unlimited.
 - c. Williams Products, Inc.
- E. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - a. The Burke Co.
 - b. Greenstreak Plastic Products Co.
 - c. W.R. Meadows, Inc.
 - d. Progress Unlimited.
 - e. Schlegel Corp.
 - f. Vinylex Corp.
- F. Sand Cushion: Clean, manufactured or natural sand.
- G. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

Cast-in-place Concrete

1. Polyethylene sheet not less than 8 mils (0.2 mm) thick.
- H. Vapor Barrier: Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic antistick sheet. Water vapor transmission rate of 1 perm when tested according to ASTM E 96, Method B. Provide manufacturer's recommended mastics and gusset tape.
1. Product: Subject to compliance with requirements, provide Sealtight Premoulded Membrane by W.R. Meadows, Inc.
- I. Nonslip Aggregate Finish: Provide fused aluminum oxide granules or crushed emery as the abrasive aggregate for a nonslip finish, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, nonglazing, and unaffected by freezing, moisture, and cleaning materials.
- J. Colored Wear-Resistant Finish: Packaged dry combination of materials consisting of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground nonfading mineral oxides interground with cement. Color as selected by Owner from manufacturers' standards, unless otherwise indicated.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Conshake 600 Colortone, Conspec Marketing & Mfg. Co.
 - b. Floorcron, Cormix Construction Chemicals.
 - c. Quartz Tuff, Dayton-Superior.
 - d. Surfex, Euclid Chemical Co.
 - e. Colorundum, A.C. Horn, Inc.
 - f. Quartz Plate, L&M Construction Chemicals, Inc.
 - g. Colorcron, Master Builders, Inc.
 - h. Floor Quartz, Metalcrete Industries
 - i. Lithochrome Color Hardener, L.M. Scofield Co.
 - j. Harcol Redi-Mix, Sonneborn-Chemrex.
 - k. Hard Top, Symons Corp.
- K. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m), complying with AASHTO M 182, Class 2.
- L. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- M. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. m when applied at 200 sq. ft./gal (4.9 sq. m/L).
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. A-H 3 Way Sealer, Anti-Hydro Co., Inc.
 - b. Spartan-Cote, The Burke Co.
 - c. Conspec #1, Conspec Marketing & Mfg. Co.
 - d. Sealco 309, Cormix Construction Chemicals.
 - e. Day-Chem Cure and Seal, Dayton Superior Corp.
 - f. Eucocure, Euclid Chemical Co.
 - g. Horn Clear Seal, A.C. Horn, Inc.
 - h. L&M Cure R, L&M Construction Chemicals, Inc.
 - i. Masterkure, Master Builders, Inc.
 - j. CS-309, W.R. Meadows, Inc.
 - k. Seal N Kure, Metalcrete Industries.
 - l. Kure-N-Seal, Sonneborn-Chemrex.
 - m. Stontop CS2, Stonhard, Inc.
- N. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
 2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Highseal, Conspec Marketing and Mfg. Co.
 - b. Sealco - VOC, Cormix Construction Chemicals.
 - c. Safe Cure and Seal, Dayton Superior Corp.
 - d. Aqua-Cure, Euclid Chemical Co.
 - e. Dress & Seal WB, L&M Construction Chemicals, Inc.
 - f. Masterkure 100W, Master Builders, Inc.
 - g. Vocomp-20, W.R. Meadows, Inc.
 - h. Metcure, Metalcrete Industries.
 - i. Stontop CS1, Stonhard, Inc.

Cast-in-place Concrete

O. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. Aquafilm, Conspec Marketing and Mfg. Co.
- b. Eucobar, Euclid Chemical Co.
- c. E-Con, L&M Construction Chemicals, Inc.
- d. Confilm, Master Builders, Inc.
- e. Waterhold, Metalcrete Industries.

P. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch (25 mm) thick to feathered edges.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. K-15, Ardex, Inc.
- b. Self-Leveling Wear Topping, W.R. Bonsal Co.
- c. Conflow, Conspec Marketing and Mfg. Co.
- d. Corlevel, Cormix Construction Chemicals.
- e. LevelLayer II, Dayton Superior Corp.
- f. Flo-Top, Euclid Chemical Co.
- g. Gyp-Crete, Gyp-Crete Corp.
- h. Levelex, L&M Construction Chemicals, Inc.
- i. Underlayment 110, Master Builders, Inc.
- j. Stoncrete UL1, Stonhard, Inc.
- k. Concrete Top, Symons Corp.
- l. Thoro Underlayment Self-Leveling, Thoro System Products.

Q. Bonding Agent: Polyvinyl acetate or acrylic base.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

a. Polyvinyl Acetate (Interior Only):

- 1) Superior Concrete Bonder, Dayton Superior Corp.
- 2) Euco Weld, Euclid Chemical Co.
- 3) Weld-Crete, Larsen Products Corp.

- 4) Everweld, L&M Construction Chemicals, Inc.
- 5) Herculox, Metalcrete Industries.
- 6) Ready Bond, Symons Corp.

b. Acrylic or Styrene Butadiene:

- 1) Acrylic Bondcrete, The Burke Co.
- 2) Strongbond, Conspec Marketing and Mfg. Co.
- 3) Day-Chem Ad Bond, Dayton Superior Corp.
- 4) SBR Latex, Euclid Chemical Co.
- 5) Daraweld C, W.R. Grace & Co.
- 6) Hornweld, A.C. Horn, Inc.
- 7) Everbond, L&M Construction Chemicals, Inc.
- 8) Acryl-Set, Master Builders Inc.
- 9) Intralok, W.R. Meadows, Inc.
- 10) Acrylpave, Metalcrete Industries.
- 11) Sonocrete, Sonneborn-Chemrex.
- 12) Stonlock LB2, Stonhard, Inc.
- 13) Strong Bond, Symons Corp.

R. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. Burke Epoxy M.V., The Burke Co.
- b. Spec-Bond 100, Conspec Marketing and Mfg. Co.
- c. Resi-Bond (J-58), Dayton Superior.
- d. Euco Epoxy System #452 or #620, Euclid Chemical Co.
- e. Epoxitite Binder 2390, A.C. Horn, Inc.
- f. Epabond, L&M Construction Chemicals, Inc.
- g. Concrevisive Standard Liquid, Master Builders, Inc.
- h. Rezi-Weld 1000, W.R. Meadows, Inc.
- i. Metco Hi-Mod Epoxy, Metalcrete Industries.
- j. Sikadur 32 Hi-Mod, Sika Corp.
- k. Stonset LV5, Stonhard, Inc.
- l. R-600 Series, Symons Corp.

2.5 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial

Cast-in-place Concrete

batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

1. Do not use the same testing agency for field quality control testing.
 2. Limit use of fly ash to not exceed 25 percent of cement content by weight.
- B. Submit written reports to Engineer of each proposed mix for each class of concrete prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed.
- C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
1. 4000 psi (27.6 MPa), 28-day compressive strength; water-cement ratio, 0.44 maximum (non-air-entrained), 0.35 maximum (air-entrained).
- D. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
1. Subjected to freezing and thawing: W/C 0.45.
 2. Subjected to deicers/watertight: W/C 0.40.
 3. Subjected to brackish water, salt spray, or deicers: W/C 0.40.
- E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs, and sloping surfaces: Not more than 3 inches (75 mm).
 2. Reinforced foundation systems: Not less than 1 inch (25 mm) and not more than 3 inches (75 mm).
 3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches (200 mm) after adding admixture to site-verified 2 - 3 inch (50 - 75 mm) slump concrete.
 4. Other concrete: Not more than 4 inches (100 mm).
- F. Lightweight Structural Concrete: Lightweight aggregate and concrete shall conform to ASTM C 330. Proportion mix to produce concrete with a minimum compressive strength of 3000 psi (20.7) at 28 days and a calculated equilibrium unit weight of 110 pcf (1762 kg/cu. m) plus or minus 3 pcf (48.1 kg/cu. m) as determined by ASTM C 567. Concrete slump at the point of placement shall be the minimum necessary for efficient mixing, placing, and finishing. Maximum slump shall be 6 inches (150 mm) for pumped

concrete and 5 inches (125 mm) elsewhere. Air entrain concrete exposed to weather according to ACI 301 requirements.

- G. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in Work.
- H. Fiber Reinforcement: Add at manufacturer's recommended rate but not less than 1.5 lb/cu. yd. (0.9 kg/cu. m).

2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.
- D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2 inch (38 mm) maximum aggregate.
 - b. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1 inch (25 mm) maximum aggregate.
 - c. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4 inch (19 mm) maximum aggregate.
 - d. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2 inch (13 mm) maximum aggregate.
 - 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to

Cast-in-place Concrete

receive a surface hardener: 2 to 4 percent air.

- E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
 - 1. When air temperature is between 85 deg F (29 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 - 1. Provide Class A tolerances for concrete surfaces exposed to view.
 - 2. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended mastic or pressure-sensitive tape.
 - 1. Cover vapor retarder/barrier with sand cushion and compact to depth indicated.

3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
 - 1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

Cast-in-place Concrete

- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved.
- D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure.
- B. Provide keyways at least 1-1/2 inches (38 mm) deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
- G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch (3 mm) wide by one-

fourth of slab depth or inserts 1/4 inch (6 mm) wide by one-fourth of slab depth, unless otherwise indicated.

1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
3. If joint pattern is not shown, provide joints not exceeding 15 ft. (4.5 m) in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
4. Provide joint fillers and sealants.

3.6 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- C. Install dovetail anchor slots in concrete structures as indicated on drawings.
- D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

Cast-in-place Concrete

1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

- A. **Inspection:** Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. **General:** Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- D. **Placing Concrete in Forms:** Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- E. **Placing Concrete Slabs:** Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
 1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3. Maintain reinforcing in proper position on chairs during concrete placement.
- F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions.

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch (6 mm) in height rubbed down or chipped off.
- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or

Cast-in-place Concrete

- a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. **Smooth-Rubbed Finish:** Unless otherwise shown or scheduled, provide smooth-rubbed finish on all exposed, vertical concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. **Grout-Cleaned Finish:** Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
1. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. **Related Unformed Surfaces:** At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

- A. **Scratch Finish:** Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155 (ASTM E 1155M). Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

- B. **Float Finish:** Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155 (ASTM E 1155M). Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. **Trowel Finish:** Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155 (ASTM E 1155M). Grind smooth any surface defects that would telegraph through applied floor covering system.
- D. **Trowel and Fine Broom Finish:** Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
- E. **Nonslip Broom Finish:** Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with before application.
- F. **Nonslip Aggregate Finish:** Apply nonslip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and where indicated.
1. After completing float finishing and before starting trowel finish, uniformly spread dampened nonslip aggregate at a rate of 25 lb per 100 sq. ft. (12 kg/10 sq. m) of

Cast-in-place Concrete

surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.

2. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose nonslip aggregate.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. **Filling In:** Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. **Curbs:** Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. **Equipment Bases and Foundations:** Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. **Steel Pan Stairs:** Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.12 CONCRETE CURING AND PROTECTION

- A. **General:** Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. **Curing Methods:** Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

- D. Provide moisture curing by the following methods:
1. Keep concrete surface continuously wet by covering with water.
 2. Use continuous water-fog spray.
 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4 inch (100 mm) lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches (75 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 SHORES AND SUPPORTS

- A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.

Cast-in-place Concrete

- B. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted.
- C. Extend shoring at least three floors under floor or roof being placed for structures over four stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.
- D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.
- E. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.14 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.15 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable.

3.16 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh (1.2 mm) sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch (6 mm) in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch (25 mm). Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Owner. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

Cast-in-place Concrete

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable.
 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch (25 mm) in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch (25 mm) or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.17 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Owner will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Engineer.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. (4 cu. m) plus additional sets for each 50 cu. yd. (38 cu. m) more than the first 25 cu. yd. (19 cu. m) of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 3. When total quantity of a given class of concrete is less than 50 cu. yd. (38 cu. m), Engineer may waive strength testing if adequate evidence of satisfactory strength is provided.
 4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi (3.4 MPa).
- C. Test results will be reported in writing to Engineer within 3 days. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-

Cast-in-place Concrete

day tests and 28-day tests.

- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

SECTION 13210
Elevated Water Tank

PART 1 GENERAL

1.01 SCOPE

The Contractor shall be responsible for all labor, materials and equipment necessary for the design, fabrication, construction, painting, disinfection and testing of an elevated welded steel water storage tank supported by a series of supporting columns and cross bracing. This style of tank is commonly referred to as a "Multi-Column" Tank. Design and construction of the Elevated Tank shall conform to all requirements of AWWA D100 Standard for Welded Steel Tanks for Water Storage except as modified by the requirements of these contract documents.

1.02 QUALITY ASSURANCE

The design and construction of the "Multi-Column" elevated water storage tank shall only be undertaken by a Contractor with a minimum of five years experience with elevated tank construction. The Contractor must be able to demonstrate experience through the design and construction of at least five "Multi-Column" elevated water tanks. The Contractor shall not subcontract either the design or erection of the steel tank and support structure.

1.03 DESIGN STANDARDS

All work on the water storage tank shall fully conform to the requirements of the latest published editions of the following Standard Specifications:

1. AWWA (American Water Works Association) D100 Standard for Welded Steel Tanks for Water Storage.
2. AWWA D102 - Standard for Painting Steel Water Storage Tanks.
3. AWWA C652 - Standard for Disinfection of Water Storage Facilities.
4. AWS (American Welding Society)
5. NSF (National Sanitation Foundation) 61 - Materials in contact with Potable Water.
6. Steel Structures Painting Council Manual - Volume 1 - Good Painting Practice.
7. Steel Structures Painting Council Manual - Volume 2 - Systems and Specifications.
8. ACI 318 - Building Code Requirements for Reinforced Concrete
9. ACI 301 - Standard Specification for Structural Concrete

1.04 SUBMITTALS

- A. Submit shop drawings and engineering data in accordance with the requirements of Section 01340 of these specifications.
- B. After contract award and prior to construction, the Contractor shall provide working drawings and design calculations for the elevated steel tank and the foundation. Drawings shall show the size and location of all structural components and reinforcement, the required strength and grade of all materials, and the size and arrangement of principle piping and equipment. The drawings and calculations shall bear the certification of a professional Engineer licensed in the State of Kentucky. The design coefficients and resultant loads for snow, wind and seismic forces, and the methods of analysis shall be documented.

PART 2 PRODUCTS**2.01 GENERAL**

The structural design of the elevated storage tank shall conform to the following design standards except as modified or clarified as follows:

- a. Foundations – AWWA D100 and ACI 318 – Building Code Requirements for reinforced concrete.
- b. Steel Tank – AWWA D100
- c. Steel Tank Painting – AWWA D102

2.02 TANK DETAILS

The elevated tank shall be all-welded construction of the most economical design. All members of structural steel or of reinforced concrete shall be designed to safely withstand the maximum stresses to which they may be subjected during erection and operation.

1. The minimum operating capacity of the storage tank will be 300,000 US gallons.
2. The capacity of the tank, low to high water level, shall be contained within a maximum operating range of 30'-0".

2.03 LOADS

A. Seismic Load

Design in accordance with AWWA D100-96, Section 13. The following factors shall be used:

$$Z = 0.75 \text{ (Seismic Zone Factor)}$$

All other factors shall be in accordance with Section 13.

B. Wind Load

Wind pressure shall be determined in accordance with AWWA D100-96, Section 3.1.4 for a 100 MPH wind velocity. For tanks located in coastal regions, Owner's Engineer shall consider use of increased wind load.

C. Snow Load

Snow load shall be determined in accordance with AWWA D100-96, Section 3.1.3 for 25 psf minimum loading.

2.04 FOUNDATION

A Geotechnical investigation has been carried out at the site and a copy of the report is included with the Contract Documents. Allowable bearing capacities are defined in this report. The Contractor shall retain the services of the Geotechnical consultant to verify the adequacy of the bearing stratum after the Contractor has carried out the excavation and before any concrete or reinforcement is placed. The concrete foundation shall be designed by the Contractor based upon the recommendations in the Geotechnical report.

2.05 STEEL TANK

A. General

The materials, design, fabrication, erection, welding, testing and inspection of the steel tank shall be in accordance with the applicable sections of AWWA D100 except as modified in this document.

B. Minimum Plate Thickness

The minimum thickness for any part of the structure shall be 3/16 inch for parts not in contact with water and 1/4 inch for parts in contact with water. All portions of the tank including the roof shall be of watertight construction.

2.06 ACCESSORIES

A. General

The following accessories shall be provided in accordance with these specifications. All items shall be in full conformity with the current applicable OSHA safety regulations and the operating requirements of the structure.

B. Ladders

Access ladders shall be provided at the following locations:

- a) The tower ladder shall extend up one column from near the base connecting with the balcony. The first rung shall be located approximately 8 feet above top of foundation.
- b) An outside tank ladder from the balcony to the roof hatch.
- c) An inside tank ladder from the roof hatch to the inside bottom of the tank.
- d) An inside riser ladder from the base of the riser to the bottom of the tank.

Ladder side rails shall be a minimum 3/8 inch by 2 inches with a 16 inch clear spacing. Rungs shall be not less than 3/4 inch, round or square, spaced at 12 inch centers. The surface of the rungs shall be knurled, dimpled or otherwise treated to minimize slipping. Ladders shall be secured to adjacent structures by brackets located at intervals not exceeding 10 feet. Brackets shall be of sufficient length to provide a minimum distance of 7 inches from the center of the rung to the nearest permanent object behind the ladder.

C. Fall Protection

Ladders shall be equipped with a fall arrest system meeting OSHA regulations. The system shall be supplied complete with safety harnesses, locking mechanisms, lanyards and accessories for two persons.

D. Balcony

The tank shall be equipped with a balcony not less than 30" wide with a handrail not less than 42" high. The floor shall be perforated for drainage.

2.07 OPENINGS

A. Roof Hatches

Provide two access hatches on the roof of the tank. One hatch shall be 30 inch diameter and allow access from the roof to the interior of the tank. The hatch will be hinged and equipped with a hasp for locking. The hatch cover shall have a 2 inch downward edge. The second hatch will be 24 inch diameter and flanged with a removable cover so constructed that an exhaust fan may be connected for ventilation during painting operations. The openings shall have a minimum 4 inch curb.

B. Tank Vent

The tank vent should be centrally located on the tank roof above the maximum weir crest elevation. The tank vent shall have an intake and relief capacity sufficiently large that excessive pressure or vacuum will not develop during maximum flow rate. The vent shall be designed, constructed and screened so as to prevent the ingress of wind driven debris, insects, birds and animals. The vent shall be designed to operate when frosted over or otherwise clogged. The screens or relief material shall not be damaged by the occurrence and shall return automatically to operating position after the blockage is cleared.

C. Riser Manhole

A minimum 14 x 18 inch elliptical access manhole shall be provided approximately 3 feet above the base of the wet riser. The hatch shall open inward.

2.08 RISER

The diameter of the wet riser shall be not less than 5 feet.

2.09 PIPING

A. Inlet and Outlet Piping

The vertical inlet and outlet pipe connection to the bottom of the riser shall be a 8 inch standard weight carbon steel pipe with appropriate transition to a base elbow of the same diameter. The vertical outlet pipe shall extend up into the riser one foot above the riser base.

B. Overflow

The overflow pipe shall be designed to carry the maximum design flow rate of **800** GPM. The **8** inch steel overflow pipe shall have a minimum wall thickness of 1/4". A suitable weir shall be provided inside the tank with the crest located at High Water Level. The overflow shall be routed from the weir to closely match the roof contour and extend down the ladder column and terminate approximately 1 to 2 feet above grade and discharge onto a concrete splash pad. The point of discharge shall have a 45 degree elbow to and be equipped with a stainless steel screen.

2.10 IDENTIFICATION PLATE

A tank identification plate shall be mounted on the tank riser pipe above the access manhole. The identification plate shall be corrosion resistant and contain the following information.

- a) Tank Contractor
- b) Contractor's project or file number
- c) Tank capacity
- d) Height to High Water Level
- e) Date erected

PART 3 EXECUTION**3.01 CONCRETE FOUNDATION**

The foundation shall be designed and constructed to safely and permanently support the structure. The basis of the foundation construction shall be commensurate with the soils investigation data included herein at the end of these specifications. The concrete foundation shall be constructed in accordance with ACI 301. Minimum concrete compressive strength shall be as specified in Section 03300 , "Cast-In-Place Concrete".

3.02 STEEL TANK CONSTRUCTION**A. General**

The erection of the steel tank shall comply with the requirements of Section 10 of AWWA D100 except as modified by these documents.

B. Welding

All shop and field welding shall conform to AWS and AWWA D100, Section 10. Before any welding is performed, the constructor shall make certain that the welders or welding operators have their credentials for acceptance.

C. Fabrication

All fabrication and shop assembly shall conform to the requirements of AWWA D100, Section 9, Shop Fabrication.

D. Erection

Plates subjected to stress by the weight or pressure of the contained liquid shall be assembled and welded in such a manner that the proper curvature of the plates in both directions is maintained. Plates shall be assembled and welded together by a procedure that will result in a minimum of distortion from weld shrinkage.

E. Testing

Testing for both shop and field welds shall be in accordance with AWWA D100, Section 11, Inspection and Testing. All testing shall be performed prior to interior and exterior field painting. The testing shall be performed by an independent testing agency with all costs included in the Contractor's bid and paid by the Contractor.

F. Roof Lap Joints

All interior lap joints shall be sealed by means of caulking or continuous seal welding. This shall include penetrations of roof accessories.

3.03 COATING SYSTEM**A. Materials**

1. All materials specified herein are manufactured by the TNEMEC Co., Inc., North Kansas City, Missouri (Local Contact (859) 296-2853 and are approved for use on this project.

2. Equivalent materials of other manufacturers may be substituted on approval of the ENGINEER. Requests for substitution shall include Manufacturer's literature for each product giving the name, generic type, descriptive information and evidence of satisfactory past performance on water tanks. Submittals shall include the following performance data as certified by a qualified testing laboratory:

1. ASTM B117 - Method of Salt Spray (Fog) Testing
2. ASTM D149 - Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials of Commercial Power Frequencies.
3. ASTM D3359 - Method for Measuring Adhesion by Test Tape.
4. ASTM D3363 - Method for Film Hardness by Pencil Test.
5. ASTM D4060 - Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
6. ASTM D4541 - Method for Pulling-off Strength of Coats Using Portable Adhesion Testers.
7. ASTM D4585 - Practice for Testing the Water Resistance of Coatings Using Controlled Condensation.
8. ASTM G53 - Practice for Operating Light and Water Exposure of Nonmetallic Materials.
9. AWWA D102 - Standard for Painting Steel Water Storage Tanks.
10. SSPC-SP10 - Near White Blast Cleaning.
11. SSPC Sp-6 - Commercial Blast Cleaning.

B. Surface Preparation

After fabrication, all interior surfaces shall be shop cleaned in accordance with Steel Structures Painting Council Surface Preparation Specifications No. 10 "Near White" blast cleaning. All exterior surfaces shall be shop cleaned in accordance with SSPC Surface Preparation Specification No. 6 "Commercial Blast Cleaning". After cleaning all surfaces shall be thoroughly and completely cleaned of any residue or dust.

After the tank is erected, welded, and tested, the seams and adjacent areas shall be cleaned of all slag and splatter from the welding and all surfaces that were shop primed shall be cleaned of all dirt and foreign matter.

All welded seams, abraded spots and areas not shop primed shall be cleaned in accordance with SSPC No. 10 for interior surfaces and SSPC No. 6 for exterior surfaces.

C. Application

All materials shall be brought to the job site in the original sealed and labeled containers of the paint manufacturer indicating that the quantity of each coating purchased was sufficient to properly coat all surfaces. Such certification shall make reference to the square footage figures provided to the manufacturer and the Engineer by the Contractor. Colors shall be selected by the Owner.

The Contractor shall apply each coating at the rate and in the manner specified by the manufacturer. If material has thickened or must be diluted, the coating shall be built up to the same film thickness achieved with undiluted material. Deficiencies in film thickness shall be corrected by the application of additional coat(s) of paint. Where thinning is necessary, only products of the manufacturer furnishing the paint, and for the particular purpose, shall be allowed. All thinning shall be done strictly in accordance with the manufacturer's instructions, as well as with the full knowledge and approval of the Engineer.

No paint shall be applied when the surrounding air temperature, as measured in the shade, is below 40 degrees Fahrenheit. No paint shall be applied when the temperature of the surface to be painted is below 50 degrees Fahrenheit. Paint shall not be applied to wet or damp surfaces, and shall not be applied in the rain, fog or mist, or when the relative humidity will exceed 85%. No paint shall be applied when it is expected that the relative humidity will exceed 70% or that the air temperature will drop below 40 degrees Fahrenheit within 18 hours after the application of the paint. Dew or moisture condensation shall be anticipated, and if such conditions are prevalent, painting shall be delayed until mid-morning to be certain that the surface is dry. Further, the days painting shall be completed well in advance of the probable time of day when condensation occurs, in order to permit the film an appreciable drying time prior to the formation of moisture.

D. Interior Coating System

a. Shop Primer Coat

1. Immediately after blasting and before any rusting occurs (within 12 hours maximum) apply one (1) coat of TNEMEC Series 91 H₂O Hydro Zinc Primer to unpainted areas. This coating to be applied to 2.0 - 3.0 mils dry film thickness.

b. Field Stripe Coat

1. Apply one complete coat of TNEMEC 91 H₂O Hydro Zinc to all weld seams by brush or roller.

c. Final Field Coat

1. Interior Wet Surface - Apply two (2) coat of TNEMEC Series-N140-WH02 Portapox II. Tank White to 4.0 - 6.0 mils dry film thickness per coat.
2. Interior Dry Surface - Apply one (1) coat of TNEMEC Series-N140-WH02 Portapox II. Tank White to 4.0 - 6.0 mils dry film thickness per coat.

E. Exterior Coating System

a. Shop Primer

1. Apply TNEMEC Series 91 H₂O Hydro Zinc to a dry film thickness of 2.0-3.0 mils.

b. Field Stripe Coat

1. Apply one (1) complete coat of TNEMEC 91 H₂O Hydro Zinc to all weld seems by brush or roller.

c. Field Intermediate Coat

1. Apply TNEMEC Series 66 Epoxoline to a dry film thickness of 2.0-3.0 mils.

d. Field Finish Coat

1. Apply one (1) coat of TNEMEC Series 1074-COLOR Endurashield in a color selected by the engineer/owner to a dry film thickness 2.0-3.0 mils.

F. Acceptance Of Work

All surface preparation shall be approved by the engineer/owner before primer is applied. Any coating applied without engineer/owner approval of surface preparation shall be completely removed.

Request acceptance of each coat before applying next coat.

Correct work that is not acceptable and request re-inspection.

G. Lettering

After the exterior finish coat has dried, the letters "*Bracken County Water District*" shall be painted on 1 side of the tank. The coating used for the lettering must be the same coating as specified for the exterior finish coat. Letter color and orientation shall be selected by the Owner.

The letters shall be block type, approximately 24" inches high with a brush stroke of approximately 6" wide. The lettering shall be spaced as shown on the project drawings. The Contractor shall submit a layout drawing to the Engineer for approval before proceeding with the work.

3.04 DISINFECTION

After the tank has been painted and the interior surfaces have thoroughly dried, the Contractor shall remove all visible dirt and contaminating materials. The interior of the tank shall be disinfected in accordance with Chlorination Method No. 2 of AWWA C652-92. A minimum of seven (7) days following the application of the final coat on the interior surfaces shall be allowed before the tank is sterilized or filled with water.

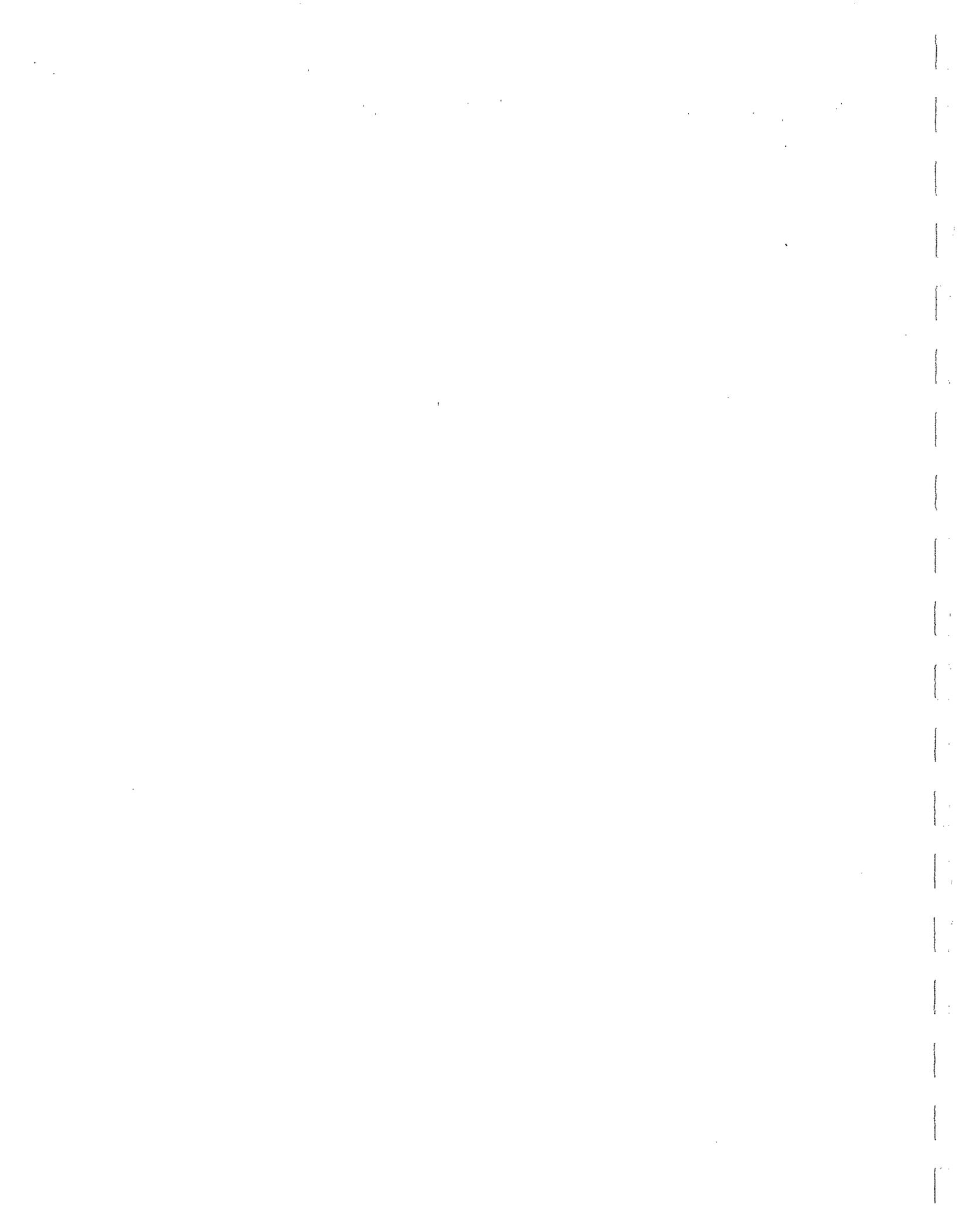
The Contractor shall be responsible for obtaining proper disinfection as determined by bacteriological testing. The Contractor shall collect and submit samples of water from the tank and have tested by the Public Health Authority having jurisdiction.

3.05 GUARANTEE

The tank Contractor shall guarantee its work for a period of one year from the completion date defined in the contract documents to the extent that it will repair any defects caused by faulty design, workmanship or material furnished under the specifications.

Revised 1/29/03

END OF SECTION



APPENDIX A
GEOTECHNICAL REPORT



Fuller
Mossbarger
Scott &
May



E N G I N E E R S

Geotechnical Exploration for
Elevated Water Storage Tank
Bracken County Water District
Site East of Brooksville
Bracken County, Kentucky

Prepared for:
HMB Professional Engineers, Inc.
Frankfort, Kentucky

August 17, 2005

Fuller
Mossbarger
Scott &
May



ENGINEERS

1409
North Forbes Road
Lexington, Kentucky
40511-2050

859-422-3000
859-422-3100 FAX

www.fmsmengineers.com

August 17, 2005

O.1.1.LX2005127R01

Mr. Jeff Reynolds
HMB Professional Engineers, Inc.
3 HMB Circle
US 460 Georgetown Road
Frankfort, Kentucky 40601

Re: Geotechnical Exploration for Elevated Water Storage Tank
Bracken County Water District
Site East of Brooksville
Bracken County, Kentucky

Dear Jeff:

As requested Fuller, Mossbarger, Scott and May Engineers, Inc. (FMSM) has performed a geotechnical exploration at the site referenced above. Submitted herein is our report that describes the scope and results of the exploration and offers our recommendations regarding the design and construction of the foundation elements for the proposed structure.

FMSM appreciates the opportunity to provide these services to HMB. If you have any questions or need additional information, please call.

Respectfully submitted,

FULLER, MOSSBARGER, SCOTT AND MAY
ENGINEERS, INC.

Hugo Aparicio

Luis J. Arduz
Luis J. Arduz, PE
Senior Project Engineer

Hugo R. Aparicio

Hugo R. Aparicio, PE
Associate

/rws

Geotechnical Exploration for
Elevated Water Storage Tank

Bracken County Water District
Site East of Brooksville
Bracken County, Kentucky

Prepared for:
HMB Professional Engineers, Inc.
Frankfort, Kentucky

August 17, 2005

**Geotechnical Exploration for Elevated Water Storage Tank
 Bracken County Water District
 Site East of Brooksville
 Bracken County, Kentucky**

Table of Contents

Section	Page No.
1. Site Description and Geology.....	1
2. Scope of Work.....	1
3. Results of Exploration.....	2
4. Conclusions and Recommendations.....	2
4.1. Rock Bearing Foundation System.....	3
4.2. General Foundation Recommendations.....	3
4.3. General Site Work Recommendations.....	4
5. Closure.....	5

List of Tables

Table	Page No.
Table 1. Summary of Borings.....	2

List of Appendixes

Appendix

- Appendix I Subsurface Logs
- Appendix II Boring Layout
- Appendix III Standard Proctor Results

Geotechnical Exploration for Elevated Water Storage Tank
Bracken County Water District
Site East of Brooksville
Bracken County, Kentucky

1. Site Description and Geology

The project site is located in Bracken County, approximately 1.5 miles southeast of the City of Brooksville and directly southwest of the intersection of KY Highway 10 and Parina Pike. The land allocated for construction of a water storage tank is currently a pasture field. The proposed structure is to be an elevated water storage tank, including four supporting legs and have an approximate 60-foot diameter. The water storage capacity of the tank will be approximately 300,000 gallons.

Available geologic mapping (*Geologic Map of the Brooksville Quadrangle, Bracken County, Kentucky, U.S.G.S., 1971*) shows the site to be underlain by bedrock of the Grant Lake Limestone corresponding to the Upper Ordovician Geologic Period. The Grant Lake Limestone is described to consist of limestone and shale. The limestone is described as medium gray in color, weathers to a pink-buff clayey soil with abundant sand- to pea-size manganese nodules and iron oxides. The limestone is also described as being fossiliferous in a micrograined matrix; in thin to medium rubbly to lumpy beds separated by shale laminate. Based upon the structure contours drawn on the base of the Fairview Formation (underlying the Grant Lake Limestone), the bedrock strata is shown to dip at an approximate rate of 44 feet per mile towards the south in the vicinity of the proposed tank site. No fault lines or other significant geologic features are shown in the immediate vicinity.

2. Scope of Work

On August 1, 2005, a field exploration was performed at the previously described project site. This exploration was conducted under the direct supervision of a geotechnical engineer from FMSM. The surface elevation at each boring location was referenced to a temporary benchmark established at the site by FMSM's engineer (as noted on the accompanying boring layout drawing). The borings were drilled using eight-inch diameter hollow-stem augers which follow a carbide-tipped tooth bit. Soil sampling and testing during the augering process consisted of standard penetration testing (ASTM D1586). These were conducted at selected intervals in order to determine the in-situ strength characteristics of the overburden material, and to collect samples for subsequent natural moisture content testing. A bag sample of the predominant soil material was collected for subsequent standard Proctor compaction testing. One of the borings was extended ten feet into bedrock utilizing rock coring equipment consisting of an NX-size core barrel and a diamond bit that obtains a 2-1/8 inch diameter rock specimen. The recovered rock core specimen was later logged with particular attention given to bedrock type, zones shown to be weathered or which exhibited soil-like characteristics and fractures. Upon completion of drilling operations, each boring was checked for the presence of groundwater and backfilled using the cuttings generated by the augering process.

3. Results of Exploration

The drawing accompanying this report illustrates the boring layout along with the general location of the proposed elevated water storage tank in reference to KY 10 and other local site features. A summary of the borings drilled at the site are tabulated below (all measurements expressed in feet):

Table 1. Summary of Borings

Boring No.	Surface Elevation	Top of Rock		Refusal		Length of Core	Bottom of Hole Elevation
		Depth	Elevation	Depth	Elevation		
B-1	103.8	10.7*	93.1	10.7	93.1	--	93.1
B-2	102.6	8.1*	94.5	8.1	94.5	--	94.5
B-3	100.3	9.1	91.2	9.1**	91.2	10.9	80.3

* Indicates top of rock-like resistance to the advancement of the augers. This may indicate the beginning of weathered bedrock, boulders, or rock remnant. An exact determination cannot be made without performing rock coring.

** Denotes depth at beginning of rock core.

Based upon the borings drilled for this exploration, the subsurface conditions at the site were found to be relatively uniform, consisting of layer of topsoil 0.5 feet to 0.6 feet thick underlain by a predominant lean clay soil. This soil appeared to be residual in origin, and was described as brown in color, moist in terms of natural moisture content, stiff to very stiff in consistency, and included manganese concretions. Soil thicknesses as measured in the test borings ranged from 8.1 feet to 10.7 feet. Groundwater was not present within the soil overburden in any of the test borings drilled for this project. However, it should be noted that groundwater levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall or other factors and are otherwise dependent on the duration of and methods used in the exploration program.

Natural moisture content determinations performed on standard penetration testing samples indicate values ranging from 16 percent to 27 percent, with an average natural moisture content of 23 percent. The maximum dry density of this soil, as determined by the standard Proctor density test, is 100.0 pounds per cubic foot at an optimum moisture content of 23.9 percent.

The bedrock encountered in Boring B-3 correlates well with the geologic reference and consisted of limestone interbedded with shale. The limestone was described as grey, fine to coarse crystalline grained, hard, thin to medium bedded and fossiliferous. The upper 1.7 feet of the rock core exhibited fractured and weathered zones. A detailed core log is included in the accompanying typed logs.

4. Conclusions and Recommendations

It is understood that the proposed elevated storage tank will have a water storage capacity of approximately 300,000 gallons. The tank will include four supporting legs.

It is on the basis of this information and the results of our exploration at the project site that the following recommendations are made. If the above concepts are incorrect, or if changes should be made to the design of the proposed structure, our firm should be notified so that appropriate adjustments in the recommendations can be made.

4.1. Rock Bearing Foundation System

4.1.1. Based upon the existing subsurface conditions encountered during this exploration and the proposed size of the water storage tank, it is recommended that the proposed structure be supported on bedrock through a system consisting of direct bearing (shallow) footings or short drilled caissons.

4.1.2. As described above, the upper 1.7 feet of the bedrock observed in a core sample is weathered and fractured. Based on this information, it is recommended that the foundation elements be placed, in general, a minimum of 20 inches below the top of rock.

4.1.3. If short drilled caissons are used, it is recommended that during caisson construction, a 1.5-inch diameter percussion test hole be drilled to a depth of 5 feet below proposed bearing elevations to verify the soundness of the underlying rock and to identify any weathered zones, clay seams and voids that might affect foundation support. The test holes should be drilled at the center of each caisson location where a rock core boring was not advanced. Each hole should be inspected by a qualified engineer or technician, using a "hooked" probe to confirm that at least 24 inches of sound rock, free of voids and compressible (clay) zones, is present directly beneath each foundation element. Any zones of questionable bearing capacity encountered in the 5 feet percussion holes should be evaluated by a qualified geotechnical engineer and the proposed bearing elevations adjusted accordingly.

4.1.4. Embedment of foundation elements into rock will not be required if the rock surface is sound and unweathered. If however, the percussion drill holes recommended in Item 4.1.3 reveal voids or soft zones below the surface, embedment will have to extend below these features until a minimum of 24 inches of sound rock is encountered.

4.1.5. For rock bearing foundation elements constructed in accordance with the recommendations contained herein, the recommended net allowable bearing capacity is thirty thousand (30,000) pounds per square foot.

4.1.6. It is recommended that Kentucky Department of Highway's "Special Note for Drilled Shafts" be referenced when preparing specifications concerning drilled shaft materials, construction methods and equipment, construction tolerances and concrete placement. This note addresses many of the same recommendations contained herein, but also includes items such as concrete slump, minimum caisson rig size, the use of casings, safety precautions, concrete placement techniques, etc. Copies of this note may be obtained from the Geotechnical Branch of the Kentucky Department of Highways.

4.2. General Foundation Recommendations

4.2.1. All foundation elements should be constructed on a level surface. Where the rock line is sloping, stair stepping of the foundations may be required to provide such a level surface. The bottom of foundations excavations should be free of all loose rock, soil and other compressible materials prior to placement of reinforcing steel and concrete.

4.2.2. Reinforcing steel should be placed in all footings to provide rigidity and strength to bridge over any weak or more compressible foundation materials, which may occur beneath the foundation system.

4.2.3. Prior to reinforcing steel and concrete placement, the foundation excavations should be inspected by a qualified engineering technician working under the direct supervision of a professional engineer experienced in geotechnical engineering.

4.2.4. Foundation excavations should not be left open to allow accumulation of rainwater and surface water runoff, as water will tend to soften and weaken the foundation rock. Concrete should be placed as soon as possible after preparation of the subgrade, or if this cannot be done, final foundation excavation should not be completed until preparations for placing concrete are complete.

4.2.5. Foundation concrete should not bear over frozen surfaces or in areas of standing water.

4.2.6. All excavations should be performed in accordance with applicable standards and regulations including OSHA construction standards for excavations. Design of excavations and related protective bracing systems is the sole responsibility of the Contractor.

4.2.7. Based on the properties of the encountered conditions at the site, a site classification of B should be used in designing the elevated water tank. This value was taken from Table 1615.1.1 of the 2002 Edition of Kentucky Building Code.

4.3. General Site Work Recommendations

4.3.1. Areas to receive fill should be stripped of all surface layer vegetation, topsoil and organic material prior to any fill placement. The actual stripping required to remove the top soil and other unsuitable materials will vary and must be verified in the field during construction. An estimated depth of stripping may be inferred by the designer from a review of the boring logs. Once stripping is complete, the subsurface should be proof-rolled in the presence of a qualified soils engineering technician and brought to design subgrade elevation with approved fill material compacted in accordance with Item 4.3.2.

4.3.2. All fill material placed at the site must be properly evaluated, placed and compacted to obtain satisfactory results. Suitable fill shall consist of soil types as described in Item 4.3.4 that are free of topsoil, organic material and rocks larger than three inches in any dimension. The selected fill material should be placed in maximum eight-inch lifts (loose thickness) and each lift compacted properly. Fill material should be compacted to a minimum of 98 percent of the soil's standard Proctor maximum density at moisture content within ± 2 percent of optimum. The in-place density should be monitored using field density gauges. Any fill to be compacted with hand compactors or other manual means should be placed in maximum four-inch lifts. All fill placements should be performed in the presence of a qualified technician experienced in the monitoring of earthwork operations. The technician should be working under the direct supervision of a professional engineer experienced in geotechnical engineering.

4.3.3. Site grading should be maintained during and after construction so that positive drainage is promoted at all times. This practice will serve to minimize the effects of moisture content fluctuation on the finished structure.

4.3.4. Fill requirements may result in obtaining off-site borrow materials. Suitable fill materials consist of native soils free of vegetation, topsoil, organics, wet soil, construction debris and rock fragments greater than three inches in any dimension. It is preferred that fill materials consist of CH, CL, SC or GC type soils. Engineering classification and standard Proctor tests should be performed on all potential fill materials, and the test results evaluated by a geotechnical engineer to determine suitability.

4.3.5. All rock used as backfill should be crushed limestone which meets gradation requirements presented in Section 805 of the Kentucky Department of Highways' "Standard Specifications for Road and Bridge Construction", current edition.

4.3.6. The contractor should be prepared to dewater foundation excavations. Although subsurface water was not encountered at any boring locations, seasonal variations and other factors may result in a change in the subsurface water conditions.

5. Closure

5.1. The scope of FMSM's services did not include an environmental assessment or investigation for the presence or absence of wetlands and hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around the site. Any statements in this report or on the boring logs regarding odors noted or unusual or suspicious items or conditions observed are strictly for the information of the client.

5.2. The boring log and related information presented in this report depict approximate subsurface conditions only at the specific boring location noted and at the time of drilling. Conditions at other locations may differ from those occurring at the boring location. Also, the passage of time may result in a change in the subsurface conditions at the boring locations.

5.3 The conclusions and recommendations presented herein are based on information gathered from the boring advanced during this investigation using that degree of care and skill ordinarily exercised under similar circumstances by competent members of the engineering profession. No warranties can be made regarding the continuity of conditions beyond the boring location.

Appendix I

Subsurface Logs



SUBSURFACE LOG

Project Number	LX2005127	Location	Brooksville, Kentucky	
Project Name	Elevated Water Storage Tank	Boring No.	B-1	Total Depth 10.7'
County	Bracken County Water District	Surface Elevation	103.8'	
Project Type	Geotechnical Exploration	Date Started	8/1/05	Completed 8/1/05
Supervisor	BLP Driller MM	Depth to Water	Dry	Date/Time 8/1/05
Logged By	BLP	Depth to Water	N/A	Date/Time N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois. Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
103.8'	0.0'	Top of Hole							
103.2'	0.6'	Topsoil							
		Lean Clay, brown, moist and stiff		SP-1	2.0' - 3.5'	1.5'	6-8-10	24	Large Bag Sample 0.6' - 8.5'
				SP-2	5.0' - 6.5'	1.5'	2-2-6	23	Boulder 8.5' - 8.7'
93.1'	10.7'			SP-3	10.0' - 10.7'	0.2'	7-50+	16	Recovered Shale fragments in SP-3

Auger Refusal /Bottom of Hole



SUBSURFACE LOG

Project Number	<u>LX2005127</u>	Location	<u>Brooksville, Kentucky</u>	
Project Name	<u>Elevated Water Storage Tank</u>	Boring No.	<u>B-2</u>	Total Depth <u>8.1'</u>
County	<u>Bracken County Water District</u>	Surface Elevation	<u>102.6'</u>	
Project Type	<u>Geotechnical Exploration</u>	Date Started	<u>8/1/05</u>	Completed <u>8/1/05</u>
Supervisor	<u>BLP</u> Driller <u>MM</u>	Depth to Water	<u>Dry</u>	Date/Time <u>8/1/05</u>
Logged By	<u>BLP</u>	Depth to Water	<u>N/A</u>	Date/Time <u>N/A</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois. Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
102.6'	0.0'	Top of Hole							
102.0'	0.6'	Topsoil							
		Lean Clay, brown, moist and stiff		SP-1	2.0' - 3.5'	1.5'	6-6-8	27	
				SP-2	5.0' - 6.5'	1.5'	4-7-9	24	
94.5'	8.1'								Limestone Remnant 7.3 - 7.6

Auger Refusal /Bottom of Hole



SUBSURFACE LOG

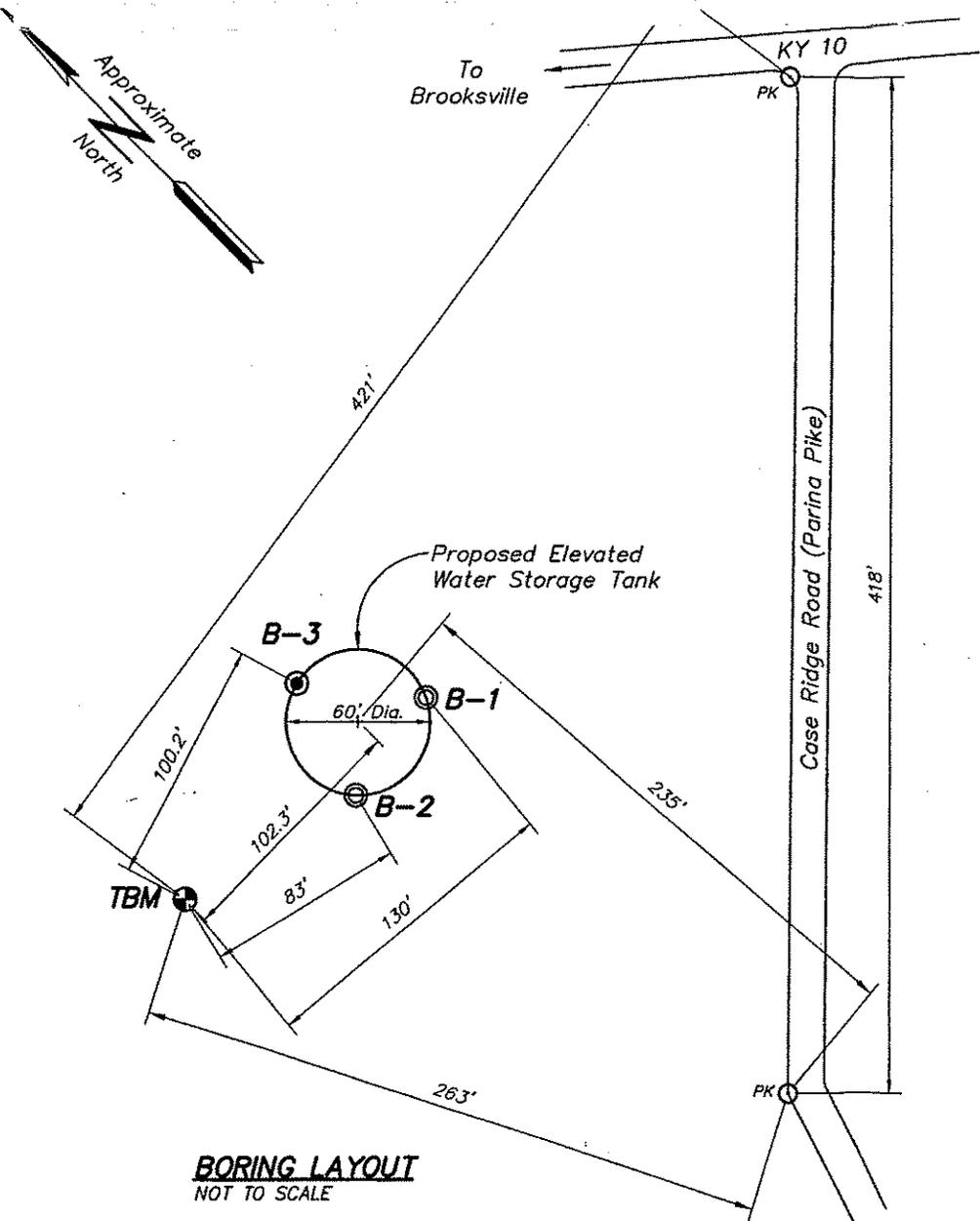
Project Number <u>LX2005127</u>	Location <u>Brooksville, Kentucky</u>
Project Name <u>Elevated Water Storage Tank</u>	Boring No. <u>B-3</u> Total Depth <u>20.0'</u>
County <u>Bracken County Water District</u>	Surface Elevation <u>100.3'</u>
Project Type <u>Geotechnical Exploration</u>	Date Started <u>8/1/05</u> Completed <u>8/1/05</u>
Supervisor <u>BLP</u> Driller <u>MM</u>	Depth to Water <u>Dry</u> Date/Time <u>8/1/05</u>
Logged By <u>BLP</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois. Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
100.3'	0.0'	Top of Hole							
99.8'	0.5'	Topsoil							
		Lean Clay, brown, moist and stiff		SP-1	2.0' - 3.5'	1.5'	6-7-10	24	
				SP-2	5.0' - 6.5'	1.5'	4-7-10	26	
91.2'	9.1'	Begin Coring							
		Limestone, light to medium gray, fine to coarse crystalline grained, nodular zones, fossiliferous, with shale stringers, partings and layers		0	1.7'	1.7'	100	10.8'	Base of weathered rock at 10.8' Estimated a.b.c. 30,000 psf
		zones in a fine-grained argillaceous matrix		19	4.2'	4.2'	100	15.0'	
80.3'	20.0'			28	5.0'	5.0'	100	20.0'	

Bottom of Hole

Appendix II

Boring Layout



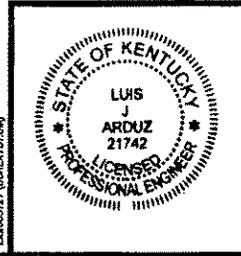
BORING LAYOUT
NOT TO SCALE

NOTES:

1. The boring layout shown is intended to be a sketch depicting the approximate circumference of the proposed water storage tank as determined by the Owner, and other site features observed at the time of the Geotechnical Exploration. The information shown is only an approximate boring location reference and should not be used for construction or any other purpose.
2. The Temporary Benchmark (TBM) for the site was established as an existing spike at the base of the utility pole and colored ribbon attached, at the approximate location indicated on the drawing. The assumed elevation for this TBM is 100.00 ft.

LEGEND

- ⊙ Soil Boring with Standard Penetration Tests
- ⊕ Soil Boring with Standard Penetration Tests and Rock Core
- PK ⊙ PK-Nail set by FSM at arbitrary locations
- TBM ⊕ Temporary Bench Mark - Spike in base of Utility Pole assumed Elevation of 100.00'



BRACKEN COUNTY WATER DISTRICT
ELEVATED WATER STORAGE TANK
BROOKSVILLE, KENTUCKY



FRANK MESSINGER
SOILS AND ROCK
ENGINEERS, INC.
1400 N. Fisher Rd.
Columbia, Kentucky
40517-3552
502-422-3308

DRAWN BY	CDV	DATE	AUG., 2005	REVISED		SHEET
CHECKED BY	BLP	PROJ. NO.	LX2005127	1	3	1 OF 1
CHECKED BY	LJA	SCALE	NTS	2	4	

Appendix III

Standard Proctor Results



ENGINEERS

Moisture-Density Data Sheet

Project: Bracken County Elevated Water Tank

Project No.: LX2005127

Source: B1-Bag, 0.6'-8.5'

Sample No.: 8

Sample Description: Lean clay (CL, brown)

Visual Notes:

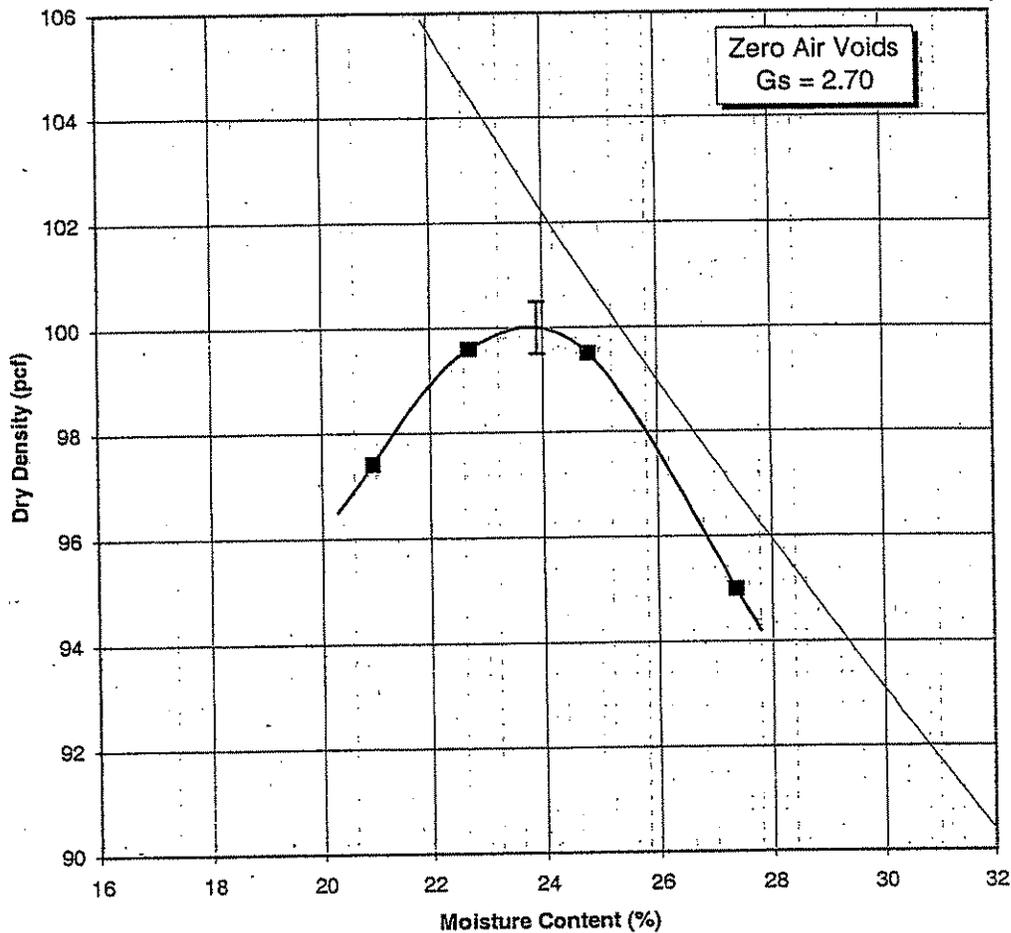
Test Method: ASTM D 698 - Method A

Prepared: Moist

Oversized Fraction: < 5 % Rammer: Manual

Gs - Fines: Estimated

Mold Weight 4265 grams		Moisture Determination				
Wet Weight plus Mold (grams)	Wet Weight minus Mold (grams)	Wet Soil and Can Weight (grams)	Dry Soil and Can Weight (grams)	Can Weight (grams)	Water Content (%)	Dry Density (pcf)
6039	1774	457.79	391.50	74.91	20.9	97.4
6105	1840	505.95	426.09	74.05	22.7	99.6
6135	1870	576.99	477.03	73.91	24.8	99.5
6087	1822	561.94	456.95	73.30	27.4	95.0



Maximum Dry Density 100.0 PCF
 Optimum Moisture Content 23.9 %



APPENDIX B

**BRACKEN COUNTY WATER DISTRICT
STANDARD SPECIFICATIONS**

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

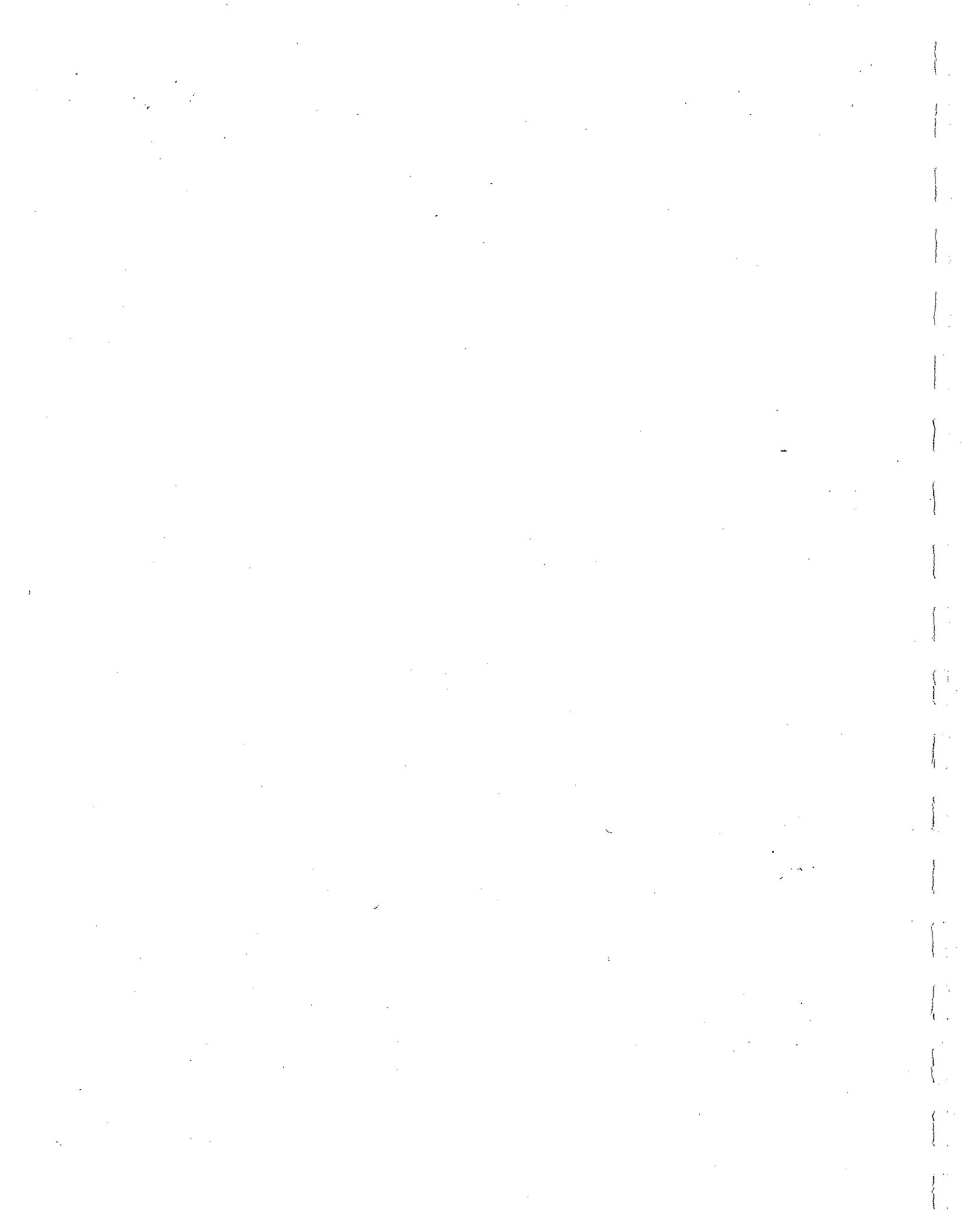
STANDARD SPECIFICATIONS
FOR
WATER LINE CONSTRUCTION

BRACKEN COUNTY WATER DISTRICT

NOVEMBER 3, 1997

PREPARED BY

MAYSVILLE SURVEY & ENGINEERING CO., INC.
107 WEST SECOND STREET
MAYSVILLE, KENTUCKY 41056

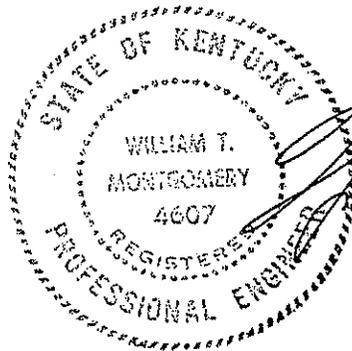


STANDARD SPECIFICATIONS
FOR
WATER LINE CONSTRUCTION
BRACKEN COUNTY WATER DISTRICT

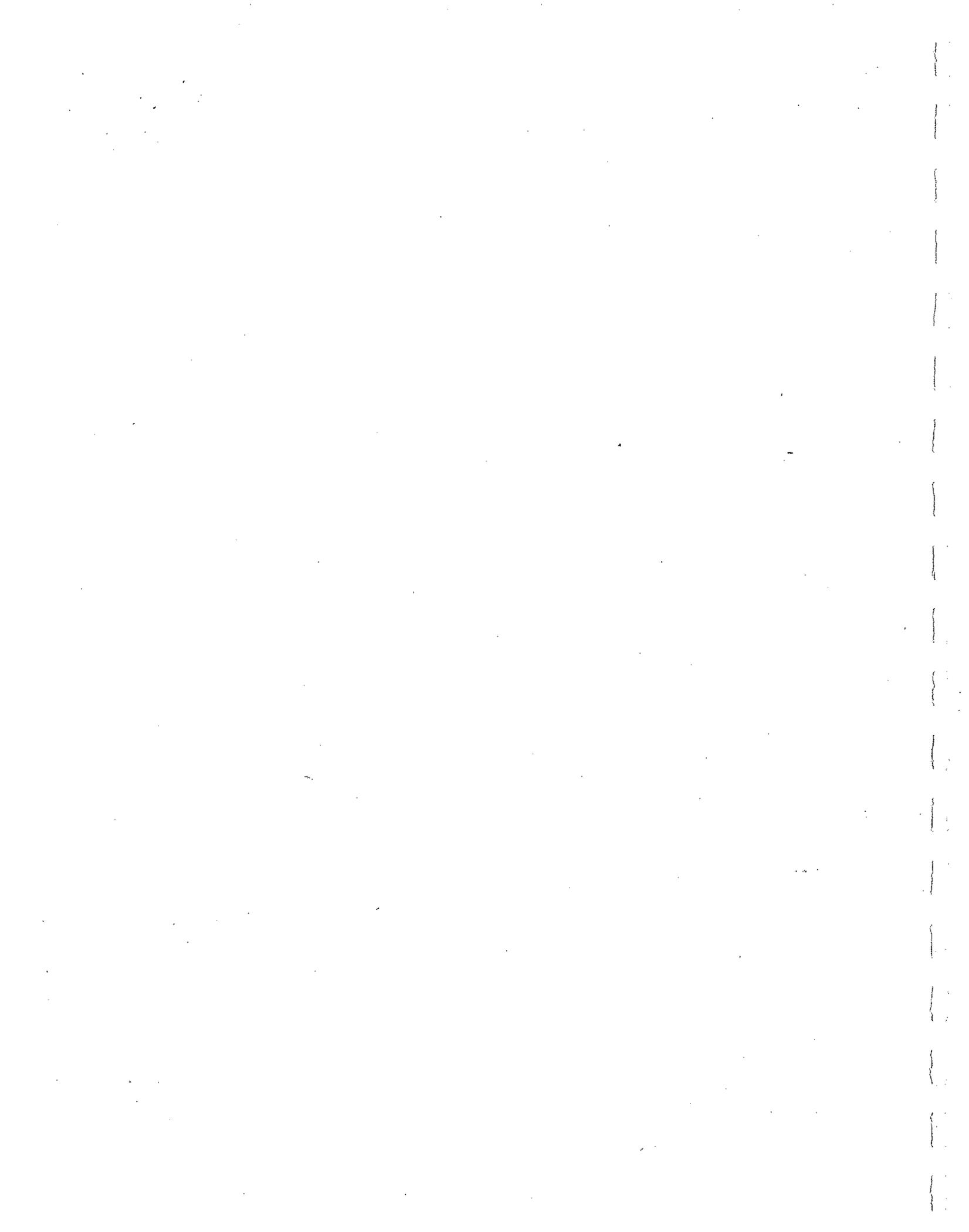
I N D E X

TECHNICAL SPECIFICATIONS

DOCUMENT NUMBER		NUMBER OF PAGES
01010	SUMMARY OF WORK	2
01031	STAKING	2
01400U	QUALITY ASSURANCE	5
02100	CLEARING & GENERAL SITE PREPARATION	2
02221	TRENCHING, BACKFILLING & COMPACTION	6
02223	ROADWAY TRENCHING, BACKFILL, COMPACTION & PAVEMENT REPLACEMENT	2
02223S	FLOWABLE FILL	4
02224	PIPE BORING AND JACKING	2
02600A	BITUMINOUS CONCRETE PAVING	3
02611	GRAVEL PAVING	1
02800	SEEDING AND PROTECTION	2
02801	FENCE REPLACEMENT & FINAL CLEANUP	1
03300	CAST-IN-PLACE CONCRETE	11
15060	METAL PIPE AND FITTINGS	3
15064	PLASTIC PIPE AND FITTINGS	4
15080	WATER SERVICE LINES AND TAPS	4
15101	GATE VALVE ASSEMBLIES	2
15121	WATER PRESSURE REGULATOR	1
15126	AIR VALVE ASSEMBLIES	2
15171	SAMPLE STATION	1
15425	BLOWOFF ASSEMBLIES	3
15530	FIRE HYDRANT ASSEMBLIES & FLUSH HYDRANT ASSEMBLIES	3
50000	STANDARD DRAWINGS	13



William T. Montgomery
11/8/57



SECTION 01010

SUMMARY OF WORK

(This Section to be completed with each project)

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Title:
- B. Project Description:
- C. Owner: Bracken County Water District
103 Woodward Ave.
P.O. Box 201
Brooksville, Kentucky 41004
(606) 735-3513
Contact: Eddie Chinn, Distribution Supervisor
- D. Engineer:
- E. Responsibility of Supervision & Construction Observation
- F. The Project will be constructed on
 - 1. on easements to the Bracken County Water District
 - 2. (other)

1.02 WORK NOT COVERED BY CONTRACT DOCUMENTS

- A. (List)
- B.

1.03 CONTRACT DOCUMENTS

- A. The Contract Documents for this project include:
 - 1. Plans prepared by the Engineer - dated:
 - 2. "Standard Specification for Water Line Construction" for the Bracken County Water District - dated November 3, 1997 - approved by the Division of Water (date), including other related specifications referenced therein.
 - 3. Applicable Standard Drawings referenced with the Standard Specifications and Special Details are included and made a part of the plans.

4. Additional (or Modifications) to the Standard Specifications/Standard Drawings specific to this project.

B. Additional or Modified Specifications Specific to this project are listed below and made a part of the Contract Documents.

<u>Document No.</u>	<u>Title</u>	<u>Addition/Modification</u>
---------------------	--------------	------------------------------

PART 2 - PRODUCTS & MATERIALS

2.01 GENERAL

2.02 FURNISHING & PAYMENT

2.03 QUALITY CONTROL/ASSURANCE

PART 3 - DESCRIPTION OF WORK

3.01 GENERAL

A. Staking (Locating work)

B. Quality Control

3.02 INSTALLATION (CONSTRUCTION)

A. Installation and Payment

B. Associated Construction (items) to be part of the project.

3.03 ITEMS OF WORK NOT ANTICIPATED ON THE PROJECT

3.04 ITEMS OF WORK TO BE PERFORMED BY OWNER
(DESCRIBE)

3.05 OTHER AGENCY APPROVALS REQUIRED

DEPT. OF TRANSPORTATION (D.O.T.)
STREAM CROSSING
STORM MANAGEMENT
PSC
OTHER (DESCRIBE)

YES

NO

END OF SECTION

SECTION 01031

STAKING

PART 1 - GENERAL

1.01 DESCRIPTION

A. It is the responsibility of the Contractor (and/or Subcontractor) to provide the necessary field surveying for construction stake-out for this project.

B. SECTION INCLUDES:

1. The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown on the CONTRACT DOCUMENTS.

2. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

3. The field surveying will apply to all items of work performed in accordance with these CONTRACT DOCUMENTS, including information for as-built drawings.

C. RELATED SECTIONS:

1. All work performed under these specifications.

1.02 SUBMITTALS

1. One copy of all field notes required for as-built drawings.

PART 2 - PRODUCTS AND MATERIALS

2.01 GENERAL

A. The Contractor shall furnish all stakes and hubs as required for the project. The stakes shall be strong, sound, straight, free from knots, dressed on 2 sides, and pointed. Hubs shall be strong, sound, undressed oak lumber, and pointed. Stakes shall be a

minimum of 19 mm (3/4 inch) thick when dressed, and hubs shall be a minimum of 50.8 mm (2 inches) square. Stake widths and lengths of both stakes and hubs, shall be that necessary for their intended use.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall furnish all necessary personnel and equipment to provide a construction staking party.

B. The Contractor's construction staking party shall perform all staking operations necessary to complete the project except those listed above which will be performed by the Owner.

C. The Contractor's staking party shall be under the general supervision of a Registered Professional Surveyor. It shall be definitely understood that the supervision of the construction staking party is solely the responsibility of the Contractor and any errors or inaccuracies resulting from the operations of the construction staking party shall be corrected at no cost to the Owner.

D. The Contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

END OF SECTION

SECTION 01400U
QUALITY ASSURANCE

PART 1 - GENERAL

1.01 DESCRIPTION

A. It is the responsibility of the Owner through their Engineer and/or specified representative to control the quality of work and materials on this project. Requirements of this section apply to the assurance to be provided to the owner of the quality of the work and materials.

B. SECTION INCLUDES

1. Field and laboratory testing of materials and products, observation of methods, and reporting the tests and observation results to the Owner for the following items of work:

- (a) Utility Excavation and Backfill
- (b) Granular Base and Asphalt Concrete Paving
- (c) Concrete and Reinforced Concrete

C. RELATED SECTIONS

1. All work performed under these specifications.

1.02 SUBMITTALS

- 1. One copy of all field and laboratory test results will be submitted to the Contractor, Engineer and Owner.
- 2. One copy of all daily observation reports will be submitted to the Contractor, Engineer and Owner.
- 3. One copy of certifications and recommendations will be submitted to the Contractor, Engineer and Owner.

PART 2 - PRODUCTS AND MATERIALS

2.01 GENERAL

A. All products and materials shall be in accordance with the requirements of these specifications or approved by the Engineer, and/or Owner in writing.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Owners representative on construction and/or Engineer shall determine the extent of field and laboratory testing required.
- B. The Contractor will secure and pay for the services of a qualified testing firm, providing services within the state which the work is being performed, and approved by the Owner. All of the work will be observed and tested by qualified technicians under the direction of a Registered Professional Engineer.
- C. Certification and recommendation will be required of the testing firm, to the Owner for approval of the various items of work.

3.02 UTILITY EXECUTION AND BACKFILL

- A. Testing firm selected shall be retained to perform construction testing on-site as follows:
1. Perform at least one compaction test at intervals not exceeding 100 feet of trench of each lift or layer of backfill placed under buildings or paved areas.
- B. If compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to Owner.
- C. The following tests shall be performed on each type of material used as compacted fill as part of construction testing requirements:
1. Moisture and Density Relationship: ASTM D698
 2. Mechanical Analysis: AASHTO T-88
- D. Field density tests for in-place materials shall be performed according to following standards as part of construction testing requirements.
1. Sand-cone Method: ASTM D 1556
 2. Nuclear Method: ASTM D 2922
- E. Certification and recommendation will be required of the testing firm for the following items of work:
1. The trench has been prepared in accordance with specifications and is recommended for backfill placement to begin.

2. All backfill has been placed in accordance with specifications.

3. All pavement and building subgrades have been prepared in accordance with specifications and is recommended for approval for base, paving and building construction to begin.

F. Testing firm shall prepare test reports that indicate test location, elevation data, and test results, and submit copies as per paragraph 1.02 within 48 hours of the time the test was performed.

G. In the event that any test performed fails to meet these specifications, Owner and Contractor shall be notified immediately by the testing firm.

3.03 GRANULAR BASE & ASPHALT CONCRETE PAVING

A. Testing as required on Department of Transportation Right of Way for base and paving construction is the Contractors responsibility.

3.04 CONCRETE AND REINFORCED CONCRETE

A. Testing firm selected shall be retained to perform construction testing for cast-in-place concrete in accordance with these specifications as follows:

1. Provide on-site observation during entire concrete pour for compliance with these specifications.

2. Confirm that all reinforcing steel, construction and expansion joints and embedded items have been installed in accordance with the specifications and is recommended for concrete placement.

3. Once test data has been procured from a particular test, the resulting reports will be distributed as specified in paragraph 1.02. In the event questionable construction methods are observed or a test fails to meet the specified requirements, the testing firm shall immediately contact the Engineer and Contractor.

4. All reports shall be made on white paper, 8 1/2 X 11 inches, suitable for photocopying and bound in booklet form. If larger drawings are absolutely necessary, they shall be folded and bound into the booklet. Written reports and analyses shall be on the testing firm's letterhead. Each drawing shall carry a title block which contains the project name and location, the responsible Engineer's name and address, the data of the investigation, and the date of the drawing.

B. Testing shall include unconfined compression tests of molded concrete cylinders, slump tests, air content tests (where air-entrainment is required) and fresh concrete temperature tests.

1. Concrete shall be sampled, cured and tested for compressive strength in accordance with ASTM C31, C39 and C172. Compressive tests shall be prepared in sets of three cylinders for each test. Specimens for each set shall be obtained at regularly spaced intervals during discharge of the middle half of a load from a stationary mixer or truck. A minimum of one set shall be taken for each 1000 square feet of surface for slabs or walls nor less than one set shall be taken per 50 cubic yards of concrete nor less than one set shall be taken for each foundation of structure except when placing a number of items each smaller than 10 cubic yards, in this case one set per 10 cubic yards shall suffice.

2. All cylinders must be immediately stored adjacent to pour under similar atmospheric conditions, under wet sand, burlap, visqueen or curing compound for approximately 24 hours after preparation. Avoid any impact during this critical time period.

3. After initial storage, the cylinders (still in their molds) shall be paced in sealed polyethylene bags, wet sand or other resilient materials and delivered to the testing laboratory.

4. The testing laboratory shall moist-cure the cylinders until they are tested.

C. TEST FOR SLUMP, AIR CONTENT AND TEMPERATURE

1. Slump tests shall be taken for each set of test cylinders as well as from each load from a stationary mixer or truck to test consistency of concrete. Tests shall be in accordance with ASTM C143 and ASTM C172.

2. The acceptance test for the air content of air-entrained concrete shall be made regularly in accordance with ASTM C173.

3. The temperature of the fresh concrete from each set of cylinders shall be recorded.

D. TEST CYLINDER IDENTIFICATION

Test cylinder sets shall be dated and numbered consecutively. Each cylinder of each set shall be given an identifying letter (A, B, C). In areas such as floor slabs and foundations a sketch shall be prepared to identify pour locations. The following data shall

be recorded on the cylinder mold at the time the cylinders are prepared and shall be included in the test report:

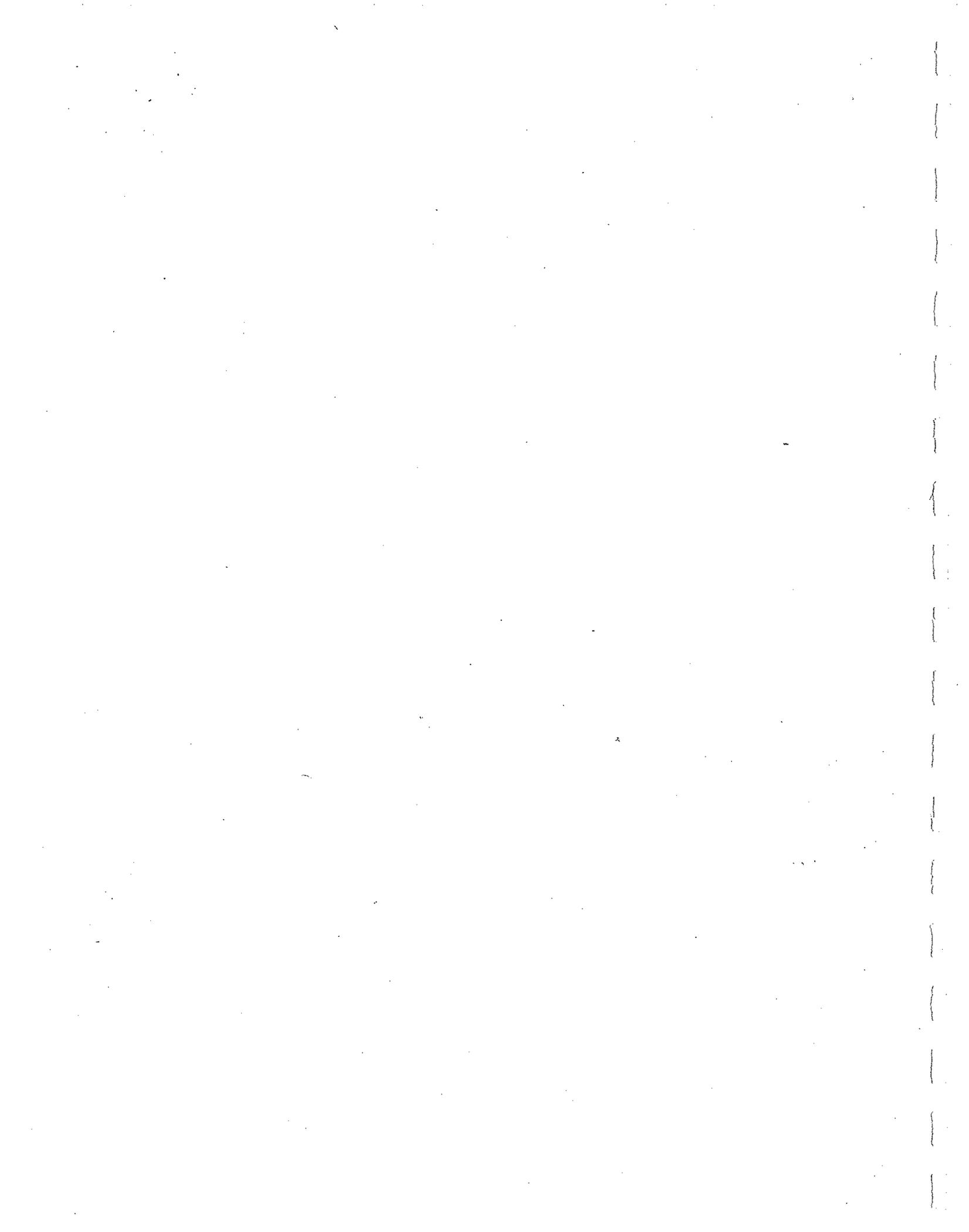
1. Test cylinder number and letter;
2. All foundations or structures covered by this test;
3. Proportions of concrete mix or mix identification;
4. Maximum size coarse aggregate;
5. Specified compressive strength;
6. Slump, air content (where applicable) and fresh concrete temperature;
7. Date poured and time poured;
8. Ambient temperature at time of pour;
9. Name of inspector making cylinders;
10. Whether cylinder failed in shear or classic conical break;

E. TEST CYLINDER RESULTS

Specimens shall be tested in accordance with Standard Method of Test for Compressive Strength of Molded Concrete Cylinders (ASTM C39).

1. Each set of cylinders shall be tested as follows:
 - (a) Cylinder A at 7 days. The result should be at least 60% of the compressive strength.
 - (b) Cylinder B and C at 28 days. Should cylinder A and B obtain the minimum compressive strength, cylinder C shall not be tested, but shall be kept as "insurance" for possible testing at a later date (not to exceed 60 days).
 - (c) The average of the B and C cylinder strengths shall be defined as the strength test result for this set.
2. If the average strength of the laboratory control cylinders for any portion of the structure falls below the compressive strengths required by the specification. The testing firm shall immediately contact the Engineer and Contractor so the appropriate decisions can be made with regard to the construction of the project.

END OF SECTION



SECTION 02100

CLEARING AND GENERAL SITE PREPARATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to all pipe trenchwork, structure and building locations and generally any location of the construction on any portion of the project.

B. Related Work Specified Elsewhere:

1. All work performed under these specifications.

PART 2 - EXECUTION

2.01 ITEMS TO BE CLEARED

A. All trees, brush, stumps, logs, tree roots, fence pipe, and other structures and materials situated at locations scheduled for excavation, fill work or erection of structures shall be removed.

B. The Contractor shall remove additional materials and structures as designated on the Drawings.

C. Improvements such as fencing, earthworks or structures at the periphery of trenchwork or other construction limits shall be preserved in an undamaged state to the maximum extent feasible. Additional structures and materials shall be preserved as designated on the Drawings.

D. Trees outside the immediate limits of construction, and particularly trees alongside trench lines on right-of-way easements, shall be preserved as is practical and feasible.

E. Any trees, shrubs, bushes or structural improvements as may be designated by the Owner's representative shall remain standing.

2.02 DISPOSAL

A. Trees, brush and other removed debris along trenches for utility construction may be deposited along the trench within a permanent owned right of way or easement, only with approval of the property owner. Otherwise, dispose of as in 2.02 (C).

B. The Owner of removed structural improvements shall be given opportunity to store or reuse any such removed items, including fencing and utility pipes, poles, etc.

C. All other removed materials shall be disposed of off the site or as designated by the Owner.

D. Any burning of materials shall be done in accordance with state and local laws.

E. Under no circumstances shall removed materials be buried beneath proposed earthwork or structural improvements; nor shall removed materials be buried close enough to improvements to affect stability.

2.03 STRIPPING

A. All topsoil, loose, organic debris and other materials unsuited as compacted fill or subgrade shall be properly stripped in the area of earthwork operations and erection of structures.

B. The topsoil shall be removed to its full depth and stockpiled for use in finish grading.

C. Any rubbish, objectionable soils and other deleterious materials shall be disposed of off the site, unless the Owner or his designated representative provides for and specifically directs on-site disposal. In no case shall such objectionable material be allowed in or under any fill unless specifically authorized in writing.

END OF SECTION

SECTION 02221

TRENCHING, BACKFILLING AND COMPACTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to all pipe trenchwork, laying, bedding, bracing, backfilling and compaction.

B. Related Work Specified Elsewhere:

1. Pipe Boring and Jacking: Section 02224
2. Metal Pipe and Fittings: Section 15060
3. Plastic Pipe and Fittings: Section 15064
4. Roadway Trenching, Backfill, Compaction and Pavement Replacement: Section 02223

C. The general location of pavements, fences and other improvements have been indicated on the drawings. However, the Contractor is encouraged to make his own investigation of surface and subsurface conditions to be encountered in the work. Improvements not shown on the drawings which are encountered during construction shall be immediately reported to the Engineer. NOTE: State Requirements for water and sewer line separation is as follows:

1. Water lines must be located at a minimum lateral distance of 10 feet from any existing or future sewer lines and sanitary sewer manholes measured from outside diameters. Where a water line must be placed in the same trench as a sewer line, the water line must be located on a shelf, 2 feet above and 2 feet to the side of the sewer line..

2. Water lines crossing under sewer lines, or crossing less than 2 feet above sewer lines, must be encased for a distance of not less than 5 feet on either side of the point of cross over.

1.02 QUALITY ASSURANCE

A. Quality Assurance will be provided in accordance with Section 01400U.

PART 2 - EXECUTION

2.01 TRENCHING

A. Trenches shall be excavated for underground pipe at the locations shown on the drawings or as directed.

B. Unless otherwise indicated on the drawings, minimum depth of cover shall be 30 inches. No extra depth excavation is anticipated and if required by the Engineer, extra depth excavation shall be conducted at no additional expense to the Owner.

C. Excavation except as required for exploration shall not begin until the proposed work has been staked out. This requirement, however, may be waived for short pipelines less than 500 feet in length.

D. Material not required for backfill and site grading shall be removed and disposed of as directed by the Engineer/Owner.

E. Trenches shall be of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe.

F. Unless specifically authorized by the Engineer, trenches shall in no case be excavated or permitted to become wider than two foot plus the diameter of the pipe at the level of or below the top of the pipe.

G. Trench sides less than five feet in height shall be vertical and not laid back to the angle of repose due to the lack of space. Trench bottom shall be smooth and uniform.

H. Before laying the pipe, the trench shall be opened far enough ahead to reveal obstructions that may necessitate changing the line or grade of the pipeline.

I. Under no circumstances shall the Contractor allow excavated materials to accumulate on streets, private property or other access ways.

J. The Contractor shall clear and grub as required to construct the work.

K. Where granular backfill is used in place of earth, the excavated earth shall be disposed of by the Contractor at the direction of the Engineer.

2.02 BLASTING

A. Where rock is encountered that cannot be removed by backhoe, bulldozer or other digging equipment without excessive ramming, blasting shall be conducted.

B. All blasting shall be conducted in accordance with municipal ordinances, state and federal laws, and "Section 1 - Explosives" of Manual of Accident Prevention in Construction published by the Associated General Contractors of America, Inc. All explosives shall be stored in conformity with said ordinances, laws and safety regulations.

C. No blasting shall be done within five (5) feet of any water mains, sewer lines, natural or manufactured gas lines, or explosives. Any damage done by blasting is the responsibility of the Contractor and shall be promptly and satisfactorily repaired by him. No blasting at all will be permitted within 300 feet of any dwelling, barn or other building without the use of adequate steel mesh blasting mats. No blasting shall be conducted within 30 feet of any rail line.

D. The Contractor shall use delay caps or other approved method to reduce earth vibrations and noise. Mud capping, as defined in the above Manual of Accident Prevention, shall not be permitted as a method of breaking boulders.

2.03 TRENCH PROTECTION

A. Adequate and proper shoring of excavation shall be the entire responsibility of the Contractor for whatever reason the need may arise. Trenches over five feet deep shall be shored or laid back at angle of repose.

B. Sheeting, shoring and bracing shall not be removed until sufficient backfill has been placed to protect the construction and/or to prevent damage to adjacent surfaces or structures, and will be renewed and maintained as long as is necessary to complete the work.

C. The Contractor, at his own expense, shall provide adequate facilities for prompt and continuous removal of water from all excavations. He shall use adequate preventive measures to exclude surface drainage from excavations and shall maintain dry conditions within the excavations until the backfill is placed. No additional compensation will be paid for replacement and/or stabilization of prepared excavations due to flooding and/or deterioration from extended exposure.

2.04 PIPE BEDDING

A. In areas that require bedding, the pipe shall be bedded with granular material free of stones, clods or other sharp-edged objects. The bedding shall be such as to receive the pipe so that the pipe weight is uniformly distributed along its length. See Standard Drawing WL 100.

B. In solid rock trenches, a minimum of six inches of granular material shall be used as bedding above and below pipe as shown in Drawing WL 100.

C. The granular material for bedding shall be sand (bank run or washed) or No. 11 stone.

2.05 PIPE LAYING

- A. Pipe shall be placed in the trench clean and undamaged.
- B. For mechanically joined pipe three inches or more in diameter, each piece of pipe shall be lowered separately into the trench.
- C. All pipe shall be laid in the trench so that it is uniformly supported on the bedding material throughout its length.
- D. Care shall be taken to prevent injury to the pipe lining and coating, if any. Any damaged pipe or fitting shall be removed from the trench.
- E. The Contractor shall maintain a supply of 22 1/2 degree and 11 1/4 degree bends on hand to make necessary horizontal and vertical adjustments.
- F. All angles or bends in the piping, either vertical or horizontal, shall be satisfactorily braced or anchored against the tendency of movement with joint harness, concrete, or approved equivalent anchors to the satisfaction of the Engineer. See Drawing WL 101. Where concrete is used, care shall be taken to place it in contact with only the fitting or valve which is being braced or anchored, and to prevent the concrete from covering flanges, bolts and adjacent pipe. Concrete for bracing shall be Class "B" concrete in accordance with Section 03300 of these Specifications.
- G. Only men competent at laying pipe shall be employed on this phase of the work, and complete suitable equipment necessary for the execution of same is required. Any incompetency observed by the Engineer must be remedied at his request, and where improper equipment or lack of same appears to be impairing the quality or speed of the work, such adjustments in same shall be made to the Engineer's satisfaction.
- H. The pipe, fittings and valves shall be placed in the trench with care. Under no circumstances shall pipe or other materials be dropped or dumped into the trench.
- I. Breaks in pipe or joints shall be repaired to the satisfaction of the Engineer and at the expense of the Contractor.
- J. The subgrade upon which the pipe bedding is placed shall consist of material suitable for supporting the pipe without excessive settlement or stress development.
- K. Pipe crossings under field tile shall be in accordance with Standard Drawing WL 102.

2.06 BACKFILL

- A. Backfilling shall be carefully placed to avoid dropping rocks or large clods on the pipe. All backfilling within six inches of the pipe shall contain no stones. Hand-shoveled placement of the initial backfill may be required by the Engineer in rocky soils.
- B. Granular backfill may be required in the absence of clean earth available. See Standard Drawing WL 100.
- C. Excavated rock larger than one foot in any dimension may not be used as backfill unless hand placed or used in upper eighteen inches of trench backfill.
- D. Where blasting has been conducted, granular backfill shall be placed to six inches above the pipe as noted in Drawing WL 100.
- E. The filling of the trench and the tamping of the backfill, where required on the Drawings, shall be carried on simultaneously on both sides of pipe in such a manner that the completed pipe lines will not be disturbed and injurious side pressures do not occur; and pipe coatings, if any, are not damaged.
- F. The compaction requirement for the mechanically tamped backfill is 95% of maximum dry density as determined by ASTM-D-1557, Method D, placed in a minimum of six inch lifts.

2.07 ENCASEMENT

- A. Casing Pipe - Open Cut
 - 1. At locations indicated on the drawings or directed on construction, casing pipe shall be installed in an open-cut trench. The casing pipe shall be installed as required in these specifications for all pipe trenchwork, laying, bedding, bracing, backfilling and compaction.
 - 2. Plastic casing pipe shall be as noted on the drawings. Steel casing pipe shall conform to the requirements of Section 02224.
 - 3. For installations using steel casing pipe and PVC carrier pipe, prefabricated spacers, or other permanent spacing devices on ten foot centers shall be installed to insure non-contact between the steel and PVC pipe.
 - 4. State road crossings and stream crossings shall be in accordance with plan drawings.
- B. Concrete
 - 1. Pipe shall be encased in concrete where shown on the drawings or as directed by the Engineer, in accordance with drawing WL 100.

2. Encasement concrete shall be Class "B" in accordance with Section 03300 of these Specifications.

3. The entire width of the excavated trench to the depth specified shall be filled with encasement concrete.

C. Boring and Jacking

1. Boring and jacking shall be in accordance with Section 02224.

END OF SECTION

SECTION 02223

ROADWAY TRENCHING, BACKFILL, COMPACTION AND PAVEMENT REPLACEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to trenchwork in city, county, and state roadways, sidewalks and shoulders, as well as private paved drives.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Pipe Boring and Jacking: Section 02224
3. Bituminous Concrete Paving: Section 02600

1.02 QUALITY ASSURANCE

A. Quality Assurance shall be in accordance with Section 01400.

PART 2 - EXECUTION

2.01 GENERAL

A. All requirements of Section 02221 shall govern general trench and backfill work in roadways, except as modified herein.

B. Unless otherwise directed by the Engineer, the Contractor shall replace all streets, alleys, drives, walks and roadways which may be removed, disturbed, or damaged in connection with his work. He shall reconstruct same to the original lines and grades and in such a manner as to leave all such surfaces in fully as good or better conditions than that which existed prior to his operations.

C. Bituminous pavement replacement shall conform to Section 02600. Concrete paving shall conform to Section 03300.

2.02 REPLACING NON-STATE MAINTAINED PAVED SURFACES

A. All work shall be in accordance with details as shown on Standard Drawing WL 103.

B. With approval of the Engineer, granular backfill may be substituted for tamped earth backfill up to within six inches plus pavement depth of the surface.

C. All granular backfill shall be compacted to 83% of solid volume density in lifts not to exceed six inches.

D. Pavement depths and widths shall match existing pavements, except that bituminous pavement depth need not exceed four inches in any case, placed in two equal lifts.

2.03 REPLACING STATE-MAINTAINED PAVED SURFACES

A. All work shall be in accordance with details as shown on the drawings and Standard Drawing No. WL 103. Flowable Backfill, as required, shall be in accordance with Section 02223S.

B. Materials and methods shall conform to applicable provisions of the Kentucky Standard Specifications for Road and Bridge Construction, latest edition in force at the date of the contract.

2.04 MAINTENANCE

A. The base course and temporary surfacing shall be maintained by the Contractor at his entire expense until the final surfaces are constructed as required.

B. At least one lane of traffic shall be kept open at all times.

C. All trenches shall be properly covered by metal sheeting overnight.

D. Both local and through traffic along State maintained routes shall be maintained in accordance with the KY Department of Highway Specifications, Section 104.04. Local thoroughfares and thruways shall be maintained in such manner that local residents shall have access to their property from at least one direction.

2.05 ROADWAY SHOULDERS

A. All trenches centered within four feet of pavement edge shall be backfilled with tamped local backfill in six inch lifts, or compacted granular backfill (DGA or No. 9).

B. All disturbed ditches shall be restored to original flow lines or improved, as necessary, to flow towards culverts or streams without obstruction or ponding.

END OF SECTION

SECTION 02223S
SPECIAL SPECIFICATION
FLOWABLE FILL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The requirements of this Section apply to flowable fill used as backfill of open-cut trenches under state-maintained surfaces.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Roadway, Trenching, Backfill, Compaction & Pavement Replacement: Section 02223

1.02 QUALITY ASSURANCE

A. Quality assurance shall be in accordance with Section 01400U.

PART 2 - MATERIALS

2.01 D.O.T. REFERENCE

A. Section references herein are to the Department's 1994 Standard Specifications for Road and Bridge Construction.

2.02 DESCRIPTION

A. When desired, and no specific method of backfill is specified, furnish and place flowable fill as backfill material for all types of pipe. Flowable fill is a low strength mixture that consists of portland cement, sand, class F fly ash, water and other materials as approved by the Engineer. Flowable fill has a density between 1842 kg/m^3 (115 lb/ft^3) and 2082 kg/m^3 (130 lb/ft^3) and has a consistency that allows it to flow under and around pipe. Flowable fill does not require compaction, finishing, or curing and does not settle after hardening. Use in restricted areas where placing and compacting fill material is difficult and where long traffic delays are not desirable. When backfilling aluminum pipe, provide an approved means of separation such as bituminous coating.

2.03 MATERIALS

A. Mixture Requirements and Proportions conform to the following sections:

Portland Cement, Type I	801
Sand	804.03
Fly Ash, Class F	844 (Contrary to subsection 844.01, the loss on ignition will not exceed 12%)
Water	803

Unless otherwise approved by the Department, proportion flowable fill as follows, per cubic meter (cubic yard):

Cement	14 kg (30 lbs.)
Fly Ash, Class F	136 kg (300 lbs.)
Sand (S.S.D.)	1360 kg (3,000 lbs.)
Water (Maximum)	250 kg (550 lbs.)

B. Alternate Mixtures: The Department may approve other mixtures. The mixtures may include other proportions of the above materials, Class C fly ash, chemical admixtures, or aggregate not conforming to the requirements of the Standard Specifications. When deviating from the above specified proportions and materials, make and test a trial batch of at least 3.6 cubic meters (4 cubic yards) to insure that the mix will have flow and density characteristics suited for the intended use. Use the ingredients, proportions, and equipment intended for the project including batching, mixing, and delivery. Require mixtures to be firm within 3 hours. General guidelines are as follows:

1. Require a minimum flow of 200 mm (8 inches) when tested with a 75-mm X 300-mm (3 inch X 6 inch) opened ended cylinder modified flow test.
2. Mixture bleeds freely within 10 minutes.
3. Require the mixture to support a 68 kg (150 lbs.) person within 3 hours.

The Department will observe all phases of the trial batching for approval. Submit the proposed mixture proportions and test results for the minimum flow, time of bleeding, and time to achieve firmness to the Engineer for review and approval. When the mixture is proprietary, comply with Section 107.05.

C. Testing: The Department will cast test cylinders for each 229 cubic meters (300 cubic yards) of flowable fill placed. Do not rod the cylinders, but lightly tap the sides of the mold. Allow the test cylinders to bleed for about 30 minutes, refill, and then cover with a sheet of tough durable impervious plastic or cylinder lid. Secure the plastic in place around the mold, within one inch of the top, with a rubber band or string then cover the lid with wet burlap. Remove the burlap after 24 hours and cure at 15.6°C

(60°F) to 32.2°C (90°F), in the shade, for 28 days. Require an average compressive strength of 345 kPa (50 psi) to 690 kPa (100 psi) at 28 days. This strength range provides the optimum balance of cohesion and ease of subsequent removal when necessary.

PART 3 - EXECUTION

3.01 PIPE BEDDING & BACKFILL

A. Pipe Bedding: All carrier pipe may be bedded with granular material to a maximum of 6 inches over the pipe. All bedding material shall be thoroughly compacted.

B. Trench Backfill: All backfill within existing and proposed pavement areas from six inches over the pipe to existing subgrade shall be Flowable Fill meeting the requirements of the attached specifications. No granular backfill is allowed.

3.02 CONSTRUCTION

A. Deliver: Unless otherwise approved by the Department, deliver the flowable fill in revolving drum truck mixers conforming to Section 601 and ensure the mixture is in suspension when placed. Agitate during transportation and waiting time to prevent subsidence.

B. Placement: Require a minimum trench width of 152 mm (6 inches) clearance on each side of the pipe. Standing water in the trench is acceptable when backfilling with flowable fill. Deep trenches may require bleeder trenches or placement in layers to drain excess water.

Because certain types of pipe may float, backfill in lifts or anchor the pipe when necessary. Backfilling in lifts is more applicable to long lines of pipe, allowing time for a substantial amount of the water to dissipate before applying the next lift. Anchors may be made of small lumber or metal straps, and adequately spaced. For larger diameter pipe, it may be possible to maintain a surge of flowable fill on top of the pipe to prevent floating. Floating will usually not occur after the level of the backfill is above the springline of the pipe. Ensure that the pipe remains in the correct horizontal position and elevation.

Place flowable fill by discharging directly from truck chutes into the trench or place by means of conveyors, buckets or pumps. When pumping, fill the voids adequately with solid particles to provide cohesion during the transport through the pump line under pressure to prevent segregation and line blockage. Maintain continuous flow through the pump line to prevent segregation and line blockage.

Place the flowable fill from the top of the compacted bedding to the bottom of the pavement structure. Unless otherwise directed by the Engineer, require a minimum of 2 hours before the addition and compaction of any material above the flowable fill.

To expedite settling and hardening in cool weather, drain or pump the bleed water from the surface or overflow the trench to allow bleed water to flow out. When overflowing, remove all excess material after hardening.

C. Mixture Adjustments: To expedite settlement and hardening, the flowable fill will bleed water within 5 to 10 minutes after placement. The release of water by bleeding causes the solid particles to realign and become firm. Delay in bleeding indicates there are too many fines in the mixture or insufficient water. If the maximum water was added, reduce the fly ash quantity in increments of 23 kg (50 lbs.) until the mixture bleeds freely. Add approximately 27 kg (60 lbs.) of sand to replace each 23 kg (50 lbs.) increment of fly ash to maintain the original yield. When two increment reductions, 46 kg (100 lbs.), do not promote free bleeding of the mixture, evaluate other possible remedies. The flowable fill is too dry when cracks develop as it flows into place.

END OF SECTION

SECTION 02224

PIPE BORING AND JACKING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Pipe shall be bored or jacked (pushed) where shown on the drawings.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221

PART 2 - PRODUCTS

2.01 STEEL CASING PIPE

A. Casing pipe shall be steel, plain end, shall conform to AWWA C 202, and shall have a minimum wall thickness of 3/8 inch throughout, unless otherwise specified on the drawings.

B. Casing pipe to be bored and jacked shall neither be coated or wrapped.

C. Pipe shall be furnished in 18 foot minimum lengths, except for special lengths ordered to complete a full length of casing pipe as may be approved by the Engineer.

D. Steel for casing pipe shall have minimum yield strength of 35,000 psi.

E. Steel casing pipe shall be sized as follows unless otherwise approved by the Engineer.

Carrier Pipe	Casing Pipe
1"	2"
2"	4"
4"	8"
6"	10"
8"	14"
10"	16"
12"	18"

2.02 JOINTS

A. If required, joints welded in the field shall be made by a duly certified welder. Joints shall be solidly welded in accordance with AWWA C 202.

PART 3 - EXECUTION

3.01 BORE OR JACK

A. Where designated on the drawings or when directed by the Engineer, crossing beneath roads or other surfaces are to be installed by boring or jacking, so as the existing surface shall not be disturbed. In such instances, the Contractor shall provide a jacking pit, bore thorough the earth, and/or rock, jack the cover pipe into proper position and grade and then install the pipe within the cover pipe by pushing.

3.02 CLOSURE

A. Where the carrier pipe enters the casing pipe underground, the gap between the casing pipe I.D. and carrier pipe O.D. shall be closed against foreign materials but not tightly sealed.

3.03 PUSHING

A. Where designated on the plans or when directed by the Engineer, two inch or smaller crossings beneath roads or other surfaces shall be pushed (or jacked) so as not to disturb the existing surface. The Contractor at his discretion, may or may not use a casing pipe. The method of pushing and the finished push shall meet the approval of the Engineer on construction. For "pushed" crossings no direct payment will be allowed for any casing pipe used or the pushing operations and such work shall be incidental to the work performed under the bid items for the carrier pipe of the class and size constructed.

3.04 ROAD CROSSINGS

A. Bored or pushed crossings beneath roadways shall be a minimum of 30 inches below the roadway ditch. The bore or push shall begin (or end) at a minimum distance of 1.5 times the depth of pipe from the edge of pavement.

END OF SECTION

SECTION 02600A

BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section shall apply to all asphaltic paving including resurfacing of existing asphalt surfaces.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221

1.02 QUALITY ASSURANCE

A. All work shall be in conformance with the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction", latest edition, hereinafter referred to as the "KYDOT Specifications".

PART 2 - PRODUCTS

2.01 DENSE GRADED AGGREGATE

A. Dense graded aggregate shall consist of crushed stone or crushed slag in combination with approved mineral filler as needed to meet grading requirements. The aggregate shall have a sand equivalent value of no less than 25.

The aggregate shall meet the following general requirements.

Wear (except slag)	40% (maximum)
Wear (slag only)	50% (maximum)
Soundness (5 cycles)	12% loss (maximum)
Friable particles	1.0% (maximum)
Shale	2.0% (maximum)
Unit Weight (slag)	70 pcf (maximum)

B. Grading requirements for dense graded aggregate are as follows:

Nominal Size	Amount	Finer than	Each Lab Sieve	(% by wgt).				
Size	Sq. Openings	1	3/4	3/8	#4	#10	#40	#200
DGA	3/4 to 1	100	70-100	50-80	35-65	25-50	12-30	5-12

2.02 PRIME COAT AND TACK COAT

A. Prime coat shall meet requirements of Section 407 of the KYDOT Specifications.

B. Tack coat shall meet requirements of Section 407 of the KYDOT Specifications.

2.03 BITUMINOUS CONCRETE MATERIALS

A. Bituminous concrete for all courses shall be composed of asphalt, crushed limestone or porous aggregate, and mineral filler, as necessary, if porous aggregates are used.

B. Bituminous paving materials may be either plant mix or road mix in accordance with Sections 401 through 406 of the KYDOT Specifications.

C. Binder courses are not anticipated, but if required, shall be as listed in the latest edition of Kentucky Department of Transportation Specifications.

PART 3 - EXECUTION

3.01 AGGREGATE BASE INSTALLATION

A. After the backfill or excavation has been compacted to the correct grade, the Contractor shall then place six inches of compacted dense graded aggregate as a base course.

B. The aggregate shall be placed in one six-inch layer or two three-inch layers and thoroughly compacted to not less than 83% of solid volume.

C. Any depressions shall be filled with aggregate and the process of compacting continued until the subgrade has a smooth and uniform surface.

D. The base course shall be maintained by the Contractor at his entire expense until the final surfaces are constructed as specified.

3.02 PRIME COAT

A. The aggregate base shall be thoroughly cleaned and broomed and a prime coat of medium tar shall be uniformly applied at a rate of 0.30 gallons per square yard.

B. The prime coat shall be applied by a pressure distributor or approved pressure spray method in accordance with 407 of the KYDOT Specifications.

3.03 TACK COAT

A. A tack coat shall be applied to the base course of bituminous concrete in accordance with Section 407 of the KYDOT Specifications.

3.04 BITUMINOUS CONCRETE COURSES

A. New bituminous concrete paving shall be applied in two minimum 1/2 inch courses with tack coat between courses.

B. Paving shall be mixed and placed in accordance with requirements for plant mixed or road mixed bituminous paving depending on type selected by Contractor. Applicable requirements are listed in Section 401 through 406 of the KYDOT Specifications.

3.05 PAVEMENT REPLACEMENT

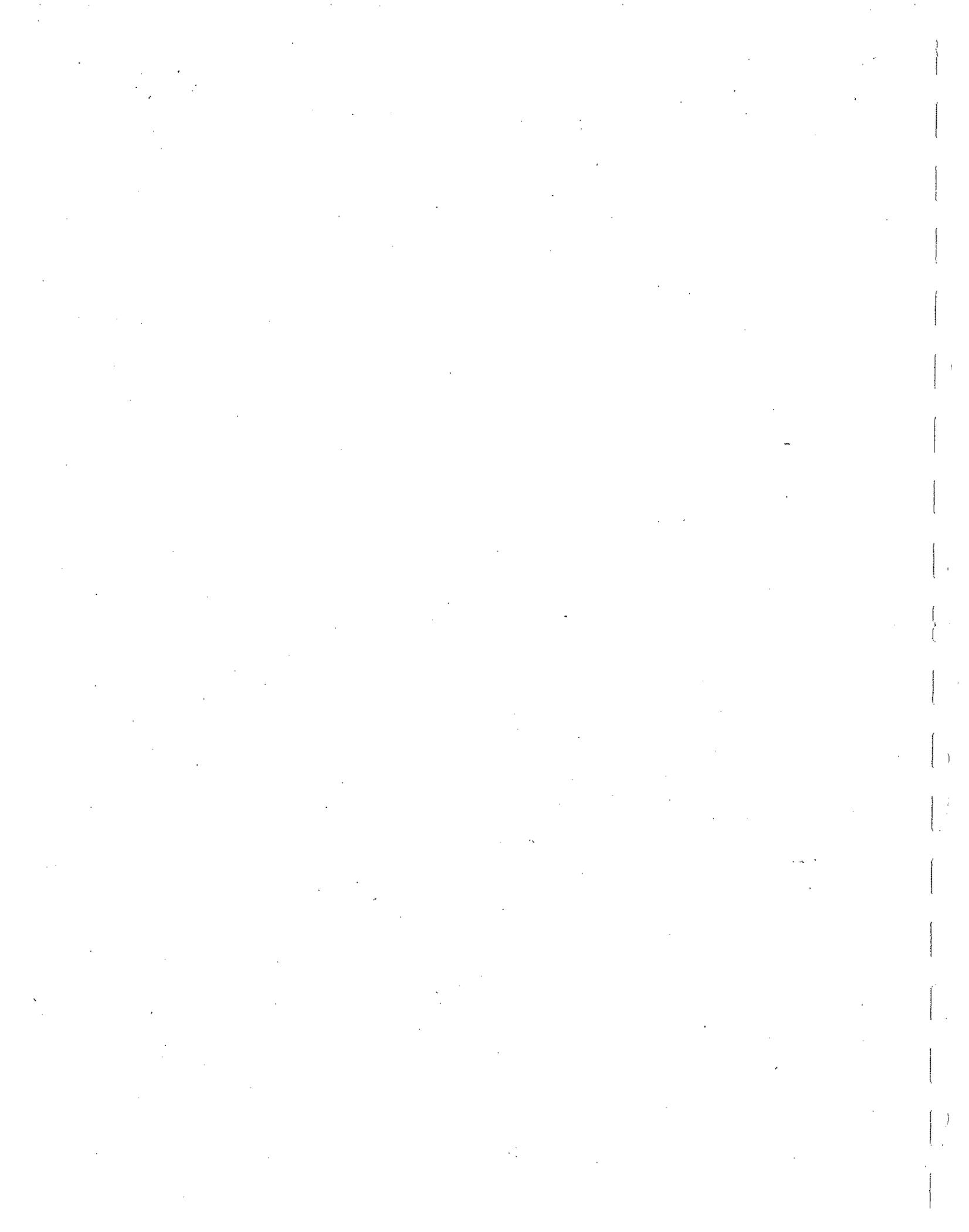
A. All existing bituminous pavements disturbed by trench work shall be restored to their original conditions with dense graded aggregate and bituminous courses equaling the dimensions of existing courses unless otherwise specified.

Construction methods shall conform to requirements given above. See Standard Detail WL 103.

3.06 SEASONAL AND WEATHER LIMITATIONS

A. In the event the progress and scheduling of the work is such that the bituminous pavement replacement would occur in the winter months, during adverse cold weather and/or during such times the asphalt plants are not in operation, then the final pavement replacement shall be postponed until favorable weather occurs in the spring and the asphalt plants resume normal operations. No bituminous concrete shall be laid between November 15 and April 1, nor when the temperature is below 40 degrees F., except by written permission of the Engineer. The Contractor will be required to maintain temporary surfacing approved by the Engineer until the permanent pavement is placed. Such labor, materials and equipment as is required for temporary maintenance of the streets, roadways, and driveways shall be provided at the Contractor's expense and is not a pay item.

END OF SECTION



SECTION 02611

GRAVEL PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Roadway Trenching, Backfill and Compaction: Section 02223

1.02 QUALITY ASSURANCE

A. All references to stones by name or number shall represent stone classifications of the Kentucky Department of Transportation. Not only gradation requirements but soundness, percent crushed face and all other related DOT requirements must be met by the stone in question.

1.03 TIMING OF REPLACEMENT

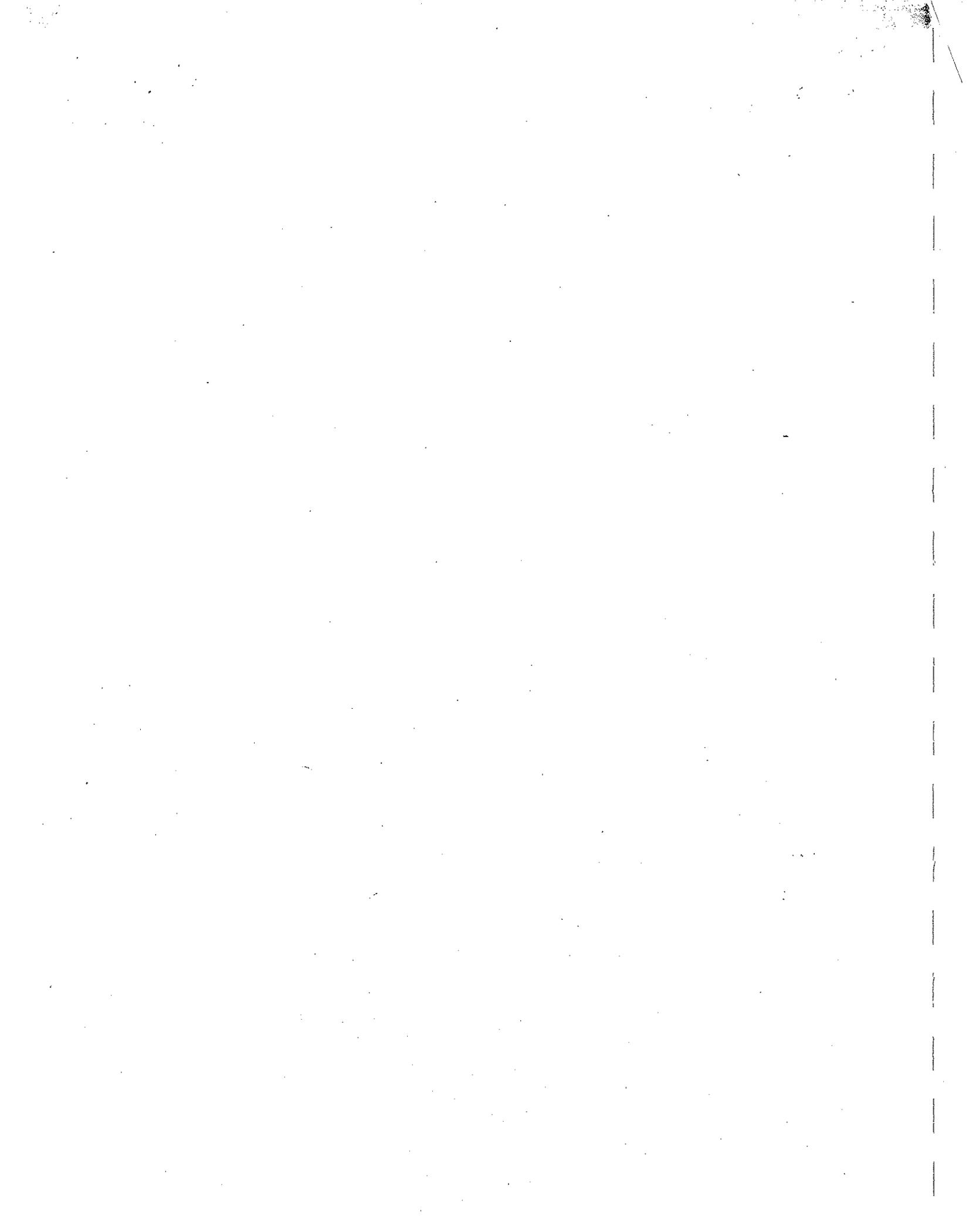
A. Gravel drives shall be backfilled and restored within 12 hours of disturbance and shall not be left open overnight. Backfilling and compaction shall be as specified in Section 02223 of these specifications for Non-State maintained paved surfaces.

PART 2 - PRODUCTS

2.01 GRAVEL ACCESS DRIVES AND ALL PRIVATE/PUBLIC ROADS

A. All existing private and public gravel surfaces shall be replaced to the existing depths, compacted in place, with No. 610 stone, or equal.

END OF SECTION



SECTION 02800

SEEDING AND PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. All graded or disturbed areas not to be paved shall be seeded and protected following construction activities according to requirements of this section.

PART 2 - MATERIALS

2.01 SEED MIXTURE

A. Seed mixture shall be a commercial brand including at least 30% Kentucky Bluegrass, 20% rye grass and 15% red top or red fescue. Where lawns are to be seeded, a commercial brand of seed mixture corresponding to the existing lawn grasses shall be used.

2.02 MULCH

A. Mulch shall consist of wheat or rye straw or threshed fescue straw.

2.03 FERTILIZER

A. Fertilizer shall be 8-8-8 or better.

PART 3 - EXECUTION

3.01 SOIL PREPARATION

A. When the final grading has been completed, the ground has settled and all rocks and debris have been removed, the entire area to be seeded shall be fertilized at the rate of 15 pounds per 1000 square feet.

B. After the fertilizer has been distributed, the Contractor shall disc or harrow the ground to thoroughly work the fertilizer into the soil.

3.02 SEEDING

A. Seed shall be sown at the rate of two pounds per 1000 square feet.

B. Seed shall be broadcast by hand or approved sowing equipment at the rate specified.

3.03 PROTECTION

A. Mulch shall be applied uniformly over all seeded areas at the rate of two tons per acre.

B. On earth embankments, mulch shall be held in place by using small stakes and twine or other method acceptable to the Engineer.

C. On all other areas, the mulch shall be stabilized by running a "weighted" disc harrow with discs set straight, over the area on the contour, after the mulch has been applied, so as to imbed or press a part of the straw into the soil sufficiently to hold it in place. On areas too steep to use a disc harrow, the stake and twine or other method will be used as approved by the Engineer.

END OF SECTION

SECTION 02801

FENCE REPLACEMENT AND FINAL CLEANUP

PART 1 - GENERAL

1.01 PERMANENT FENCE RESTORATION

A. All fences that are disturbed in the course of construction must be either restored to their original condition or replaced in kind.

B. Other structures such as concrete, block or stone walls or fence bases along with any other structures that are disturbed during construction must be either restored to their original conditions or replaced in kind.

1.02 FINAL CLEANUP

A. Backfilled trench work shall be left neat and clean. Debris that is not disposed of and backfilled trenches that are not smoothly graded shall be cause for withholding any monies due the Contractor and withholding the Performance Bond.

B. All shrubs, hedge, flowers, trees, etc., that are disturbed in the course of construction must be either restored to their original condition or replaced in kind.

END OF SECTION



SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Concrete materials and procedures herein specified apply to all concrete work.

1.02 QUALITY ASSURANCE

A. Any procedure, material or operation specified by reference to the American Society for Testing Materials (ASTM), the American Concrete Institute (ACI), local building code or other reference, shall comply with the requirements of the current and most recent specification. The more stringent requirements shall govern.

B. The Contractor is expected to obtain the most recent issue of all standards, recommendations, codes or specifications referred to within this specification. Copies of key standards are available at the Contractor's expense from:

American Concrete Institute
P.O. Box 4754
Redford Station
Detroit, Michigan 48219

American Society for
Testing Materials
1916 Race Street
Philadelphia, PA 19103

C. Testing and test result compilation shall be conducted at the Owner's expense with samples furnished by the Contractor.

1. Compressive Strength (f'c) of Concrete

a. Samples for strength tests of each class of concrete shall be taken as directed by the Engineer in accordance with the appropriate ASTM standard. Each strength test result shall be the average of two cylinders from the same sample tested at 28 days or the specified earlier age.

b. The strength level of the concrete will be considered satisfactory if the average of all sets of three consecutive strength test results equal or exceed the required f'c and no individual strength test result falls below the required f'c by more than 500 psi.

c. Should individual tests of laboratory-cured specimens produce strengths more than 500 psi below f'c or tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that load-carrying capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate that the load-carrying capacity may have been significantly reduced, tests of cores drilled from the area in question may be required in accordance with "Standard of Concrete" (ASTM C-42). Three cores shall be taken for each case of a cylinder test more than 500 psi below f'c. The cores shall be immersed in water for at least 48 hours and tested wet. Payment for drilled cores and additional testing shall be the responsibility of the Contractor.

Concrete represented by the core tests will be considered structurally adequate if the average of the three cores is equal to at least 85 percent of f'c and if no single core is less than 75 percent of f'c.

2. Other tests will be conducted at the direction of the Engineer.

D. Actual non-compliance and/or ominous trends shall be determined by the Engineer or his appointed representative and such information shall be relayed expeditiously to the concrete supplier and confirm promptly in writing.

Testing results of concrete furnished subsequent to such notification shall comply or a second warning will be issued. Non-compliance after two warnings will be sufficient cause to refuse additional concrete from the non-complying producer.

E. Certifications

1. The Contractor and concrete producer shall submit a certificate from an approved laboratory attesting that the admixture exceeds the physical requirements of ASTM C-494, Type A, water reducing and normal setting admixture and when required, for ASTM C-494, Type D, water reducing and retarding admixture.

2. The ready-mixed concrete production facility shall hold a current certification from the National Ready Mixed Concrete Association.

PART 2 - PRODUCTS

2.01 CEMENT

A. Cement shall conform to ASTM C-150, Type I or II. Only one brand and manufacturer of approved cement shall be used for exposed concrete.

2.02 AIR-ENTRAINING AGENT

A. A neutralized vinsol resin air-entraining admixture meeting the requirements of ASTM C-26 shall be used in all concrete specified as air-entrained. The quantity used shall be varied to produce the specified amount of total air content.

2.03 WATER-REDUCING SET-CONTROLLING ADMIXTURE

A. "Pozzolith" series 100 or 200 manufactured by Master Builders Company or W.R.D.A. - Hycol or Daratard 17 manufactured by W.R. Grace & Company or an approved equal shall be used in all concrete.

2.04 WATER

A. Water shall be drinkable, clean, free from injurious amounts of oils, acids, alkalies, organic materials or deleterious substances.

2.05 FINE AND COARSE AGGREGATES

A. Fine and coarse aggregates shall conform to concrete ASTM specification C-33, "Specification for Concrete Aggregates". Maximum size of coarse aggregates shall be not larger than three-fourths the minimum clear spacing between reinforcing bars, and not larger than one-fourth the thickness of slabs. Local aggregates which have shown by tests and by actual service to produce satisfactory qualities may be used when approved by the Engineer.

2.06 SURFACE HARDENER

A. Materplate Pre-Mixed manufactured by Master Builders Company or approved equal. It shall be packaged in water-proof bags and protected from the elements on the jobsite.

2.07 CURING MATERIALS

A. The liquid membrane-forming curing compound shall meet the requirements of ASTM C-309-74, Type 2 or Corps of Engineers Specification CRD-C 300, such as "Master Seal" as manufactured by Master Builders or an approved equal.

The material shall provide a water retention not exceeding a loss of .055 gm/cm² when used at a coverage of 450 sq. feet per gallon and tested in accordance with ASTM C-156, and shall exceed the requirements of ASTM C-309. The material shall be applied to all walls within four hours after the forms are removed if the forms are removed before the concrete is seven days old.

2.08 ADDITIONAL MATERIALS

A. All materials used in the concrete, such as reinforcing steel, waterstops, joint filler and sealants, and concrete accessories, shall be subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 PROPORTIONING OF CONCRETE

A. The concrete shall be composed of cement, fine aggregate, coarse aggregate, water, water reducer, and air-entraining agent.

B. The concrete shall be homogeneous, readily placeable and uniformly workable and shall be proportioned in accordance with ACI-211.1-70 or latest edition.

C. Proportions shall be established on the basis of field experience with the materials to be employed. In the absence of suitable field performance data, laboratory trial batches shall be used. The proposed mix design shall be submitted to the Engineer for approval.

D. The admixture manufacturer, when requested, shall provide a qualified concrete technician employed by the manufacturer to assist in proportioning concrete for optimum use.

He shall also be available when requested to advise on proper addition of the admixture to the concrete and on adjustment of concrete mix proportions to meet changing job conditions.

3.02 QUALITIES REQUIRED

A. Class	A(Structural Concrete)	B(Pipe Bracing/Encasing, Post Holes)
B. Type of Cement	I or II	I or II
C. Compressive Strength (f'c) PSI @ 28 days	4500	3500
D. Slump, Inches	2 - 4	2 - 5

E. Air Content (%)	5 - 7	5 - 8
F. Minimum Cement Content, lbs/CY	550	600
G. Water/Cement Ratio (maximum)	0.45	0.65

3.03 RATE OF HARDENING

A. Concrete mix shall be adjusted to produce the required of hardening for varied climate conditions.

1. Under 40 F Ambient Temperature - accelerate with external heat. (Approval in writing from Engineer).
2. Between 40 F and 70 F - Normal rate of hardening (type D admixture).
3. Over 70 F - retardation (type D admixture).

B. Calcium chloride up to two percent will be considered for approval as an accelerating admixture when used within the recommendations of ACI-306. Prior written approval from the Engineer is required. Calcium chloride shall not be used with Chem Comp cement.

3.04 MIXING AND PLACING

A. All concrete under these specifications shall be machine mixed. Adequate equipment and facilities for accurate measurement and control of all materials shall be provided and available for readily changing the approved proportions to conform with varying jobsite conditions.

B. Ready Mix Concrete shall be used, and shall conform to the "Specifications for Ready-Mixed Concrete", ASTM C94. Approval is required prior to using job mixed concrete.

C. No frozen material or materials containing ice shall be used in cold weather. Temperatures of materials, including mixing water, shall not exceed 140 F. When placed in forms, the concrete shall have a temperature between 50 F and 90 F. Work shall be in accordance with ACI-306, "Recommended Practice for Winter Concreting".

D. During hot weather, the temperature of the concrete shall be less than 90 F. Work shall be in accordance with ACI-305, "Recommended Practice for Hot Weather Concreting".

E. All work shall be in accordance with ACI-304, "Recommended Practice for Measuring, Mixing and Placing Concrete". All construction debris and extraneous matter shall be removed from within the forms. Internal struts, to correct shape alignment,

shall be removed. All concrete shall be placed on clean damp surfaces, free from water, or upon properly consolidated fills. Concrete shall be deposited in approximately horizontal layers, not to exceed 18 inches. Concrete that has to be dropped four feet or more shall be placed through a tremie to prevent segregation.

F. Concrete shall be consolidated by means of mechanical vibrating. Vibrators shall be inserted and removed vertically at regular intervals not to exceed every 18 inches to insure uniform consolidation. In no case shall vibrators be used to transport concrete inside the forms. Internal vibrators shall maintain a speed of not less than 7,000 impulses per minute when in operation. At least one standby vibrator shall be on hand at all times. Concrete may not be ordered unless and until this extra vibrator is on the jobsite.

G. No backfill shall be placed against walls without adequate bracing to prevent cracking or displacement of the wall. All basin type structures shall be protected against flotation until they are completed and backfilled.

H. All exposed edges of concrete shall be finished with one inch chamfer.

3.05 CONSTRUCTION JOINT TREATMENT

A. Shear keys, if any, shall be where shown on the drawings. The sectional dimensions shall be 2" x 4" (nominal) unless otherwise noted.

B. Construction joints to receive fresh concrete shall be thoroughly cleaned and free from laitance, fins, and other deleterious material. The surface to receive concrete shall be roughened by a method approved by the Engineer so as to expose the larger aggregates in the hardened concrete surface.

C. Exposed construction joints shall receive treatment as noted on the drawings for the specific surface.

3.06 REINFORCEMENT AND ACCESSORIES

A. In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs.

B. The Contractor shall provide for the installation of inserts, pipe sleeves, drains, hangers, metal ties, anchor slots and other devices shown on the Construction Drawings or as necessary to complete all elements of the contract.

C. Openings for Pipes and Joints to Pipes

1. Pipes shall not be fixed in concrete wall or interior floor pours. Holes of a diameter one inch greater than the outside pipe diameter shall be formed accurately to pipe layout dimensions or shall be cored (10 inch diameter and under) in existing concrete slabs or walls.

2. When piping is placed, the annular ring around it be caulked from both sides with dry braided hemp (or unbraided where pipes do not center or grout closure is not necessary), to within one inch of wall surface or two inches if grout closure is necessary. Where exposed to view, inside basins, or where water tightness, air-tightness, support or prevention of vibration is necessary, the remaining annular ring at the surface shall be troweled full with a grout of one part Portland Cement, 1 1/2 parts sand and a nonshrink compound, Master Builder's "Embeco", or equal, in quality and according to directions of the manufacturer. Then the joint shall be raked back 1/2 inch from the surface and filled with a one to two mix grout of Portland Cement and sand. Such joints shall be water and seepage tight.

3. Where malleable pipe (steel, wrought iron, or copper), brittle pipe (hard rubber), rubber hose, or any pipe cut to fit on the job, passes through any concrete slab, floor or wall, a wrought or cast iron pipe nipple with about 1/2 inch greater diameter than the outside of the pipe shall be used as a sleeve and cast into the slab. In case of floors above ceilings, these sleeves shall extend 1/2 inch to one inch above floor surface, to prevent cleaning water from running into them.

4. Where holes greater than 10 inch diameter have to be cut for pipe in existing concrete slabs or walls, the space about the pipe shall be formed to original surfaces and the pipe wrapped with 1/2 inch braided hemp. In grouting this space, use a mixture of Portland Cement, one part, and a concrete sand, 1 1/2 parts, with the addition of a compound which will prevent shrinkage of the grouting. Use Master Builder's "Embeco" or equal, according to the manufacturer's directions. Where walls and spaces give sufficient room for safely using large aggregate, this may be added in a quantity equal to the sand specified. After removal of forms, the yarn shall be removed for a depth of two inches from water side and/or exposed surfaces, and the space refilled to surface with a grout of one part cement, one and one-half parts sand, and a nonshrink compound, Master Builder's "Embeco",

or equal, in quantity recommended by the manufacturer. Then the joint shall be raked back 1/2 inch from the surface and filled with a one to two mix grout of Portland Cement and sand.

3.07 FOUNDATION PREPARATION

A. All foundation slabs and footings and column footings of structures shown to be supported on rock shall be poured on rock or material ordered by the Engineer to extend bearings to rock. Such material shall normally be Class "B" concrete, but the Engineer can order Class "A" and/or compacted dense graded aggregate to establish rock bearing Concrete and/or compacted DGA, which are not shown or indicated on the drawings, but are required to obtain rock bearings because of changed conditions shall be paid for in accordance with unit price bid, if the Engineer orders the bearing materials installed. Bearing material (concrete and/or compacted DGA) ordered by the Engineer to correct over excavation or ruin of subgrade by Contractor's operations shall be paid for by the Contractor. The Contractor shall be responsible to preserve acceptable foundation bearing material including shale rock.

B. The subgrade for all foundation slabs and footings and column footings shall be inspected and approved by the Engineer prior to any construction thereon.

C. Rock lines shown on plans are approximate only.

3.08 FINISHING

A. Defects

1. After removal of forms, all unsightly ridges or lips shall be removed and undesirable local bulging on the surface to be permanently exposed shall be remedied. Remove blemishes and form marks. The finished surface shall be uniform, smooth and clean.

B. Horizontal Surfaces

1. All exposed horizontal concrete surfaces shall receive a smooth uniform trowel finish except that floors and walkways shall receive a light broom finish. Grout shall be worked to the surface of a concrete by hand, jitterbug, or machine for finishing, and in no case shall grout for finishing be added to the surface of the concrete nor shall cement be used to dry the surface.

C. Joints and exposed edges which are not chamfered shall receive rolled edges.

D. Water tightness

1. All concrete, when finished, must be watertight. Exposed concrete surfaces shall show no dampness when the interior of basins or exterior of pits have been filled with water for seven days. In case any leakage or dampness shows on the surface of any such walls after the time stated, then such defects must be remedied by the Contractor and work will not be accepted until this is done.

E. Application

1. The pre-mixed hardener shall be applied to all interior floors (to receive equipment or to be walked upon) at a rate of 0.6 pounds per square foot.

2. Apply to the floated concrete adjacent to forms, columns and walls where moisture will be lost first. Apply two-thirds of the specified total shake immediately following floating of total area.

3. Spread evenly and do not throw the shake.

4. Mechanical trowels with float blades shall be used as soon as shake has taken moisture (indicated by darkening of surface). Do not allow float blades to dig into the surface. Float just sufficiently to bring moisture from base slab through the shake.

5. Plan timing of this procedure so that sprinkling water on the surface will not be necessary.

6. Immediately following the floating of the first shake, apply the remaining one-third of the total specified shake in the same manner and mechanically trowel as specified. (Surface shall be further compacted by a third mechanical floating if time and setting characteristics of the concrete will allow).

7. As surface further stiffens, as indicated by loss of sheen, it shall be hand or mechanically troweled with blades relatively flat. All marks and pinholes shall be removed in the final raised trowel operation.

F. Curing and Protection

1. Designated floors shall be finished with metallic - aggregate surface hardener cured with the approved membrane curing compound. Apply the membrane curing compound immediately after the floor surface has hardened sufficiently so that it will not be marred by the

application. If the surface has dried out prior to application, it shall be saturated with potable water before applying the curing compound, which shall be applied uniformly over the entire surface at a coverage which will provide moisture retention in excess of the requirements of ASTM C - 309. When dry, the coating shall be protected from dropping of plaster, paint, dirt and other debris by a covering of scuff-proof building paper.

2. The floors shall remain covered and be kept free of traffic and loads for at least 7 days after their completion. Adequate provisions shall be made for maintaining the concrete temperature at 50 F. or above during the curing period.

G. Field Service

1. During the initial and critical periods of installation, the manufacturer of the surface hardener shall provide upon request and at no cost to the Owner, the services of a trained concrete technician. A minimum of three days notice shall be given by the Contractor to the surface hardener manufacturer prior to initial use of the product.

3.10 CURING

A. All concrete shall be cured for a period of not less than seven days or as directed by the Engineer. During that period, no part of the concrete shall be permitted to become dry. The Contractor shall have all equipment needed for adequate curing and protection of the concrete on hand and ready to install before actual concrete placement begins. The curing medium and method, or the combination of mediums and methods used, shall be approved in writing by the Engineer. All concrete shall be adequately protected from rains, flowing water and mechanical injury. All concrete shall be protected from the sun and drying winds. No fire or excessive heat shall be permitted near or in direct contact with concrete at any time.

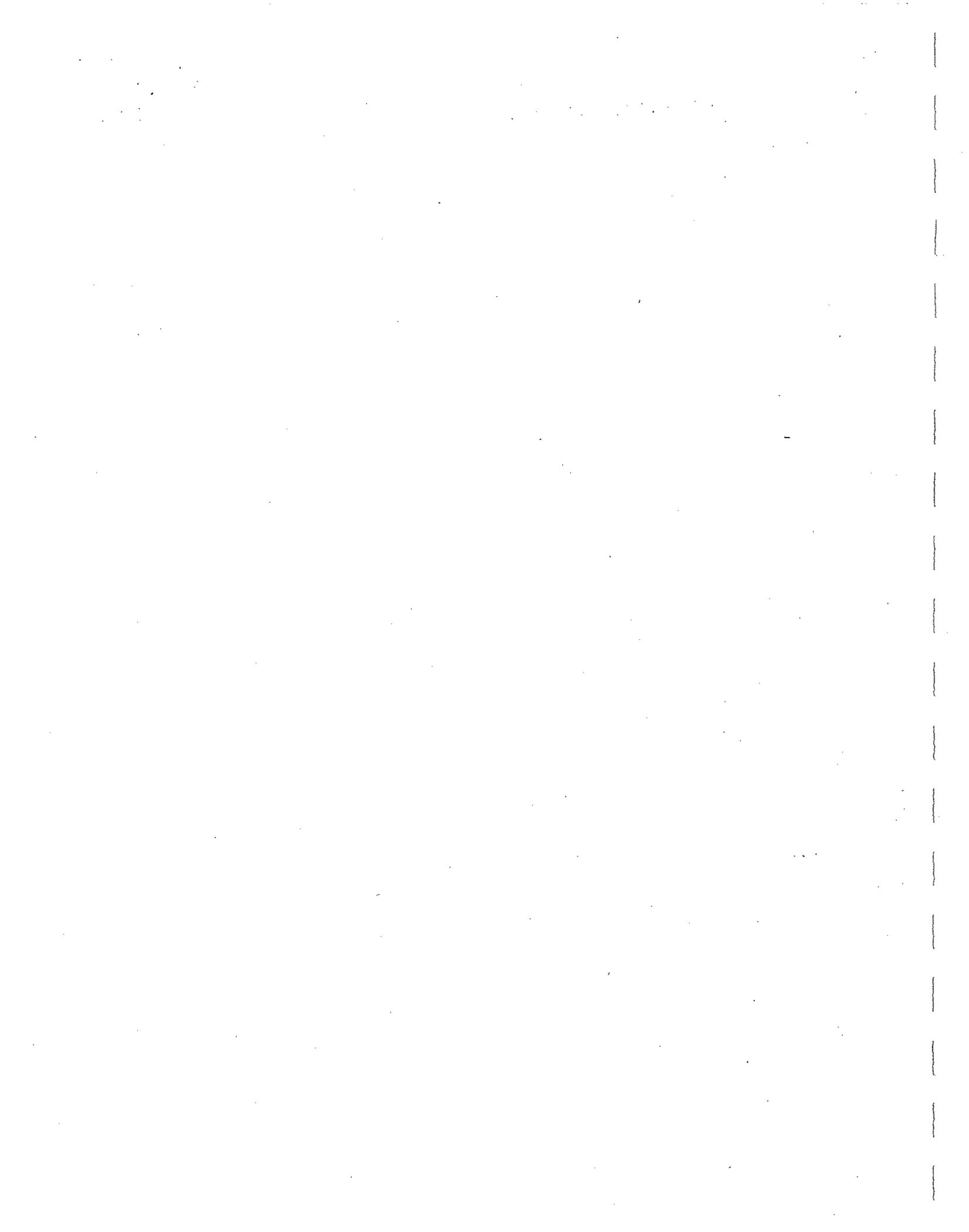
B. The curing compound shall be applied to concrete walls within four hours after the forms are removed if the forms are removed before the concrete is seven days old. On surfaces not exposed to view, the compound may be a pigmented type. Unless otherwise approved, curing compounds on surface exposed to view shall be non-pigmented type containing a fugitive dye, with the reflective requirements waived. Curing shall be applied and maintained to prevent loss of water from concrete for the duration of the curing period following removal of forms.

C. Curing compound may be sprayed or applied with a paint roller on exposed concrete flatwork. The curing compound shall be applied at a rate not to exceed 400 square feet per gallon, and shall be applied immediately after the final finishing operation. Curing may not be postponed until the following work day. With formed surfaces, apply the curing compound as soon as the forms are stripped.

Note: After October 1st and until April 1st, liquid curing compounds may not be used on exposed concrete flat work such as sidewalks, curbs, gutters and pavements.

D. During freezing weather, freshly placed concrete shall be protected from freezing and a minimum concrete temperature of 50 degree F shall be maintained for 72 hours after the placement. The concrete shall be protected by insulating blankets or forms for seven days.

END OF SECTION



SECTION 15060

METAL PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Plastic Pipe and Fittings: Section 15064

1.02 QUALITY ASSURANCE

A. Ductile iron pipe shall be used exclusively where required by the plans. Cast iron fittings may be used in contact with PVC pipe, but not with ductile iron pipe.

B. Ductile iron pipe shall comply with the following standards:

1. AWWA C151-76 and ANSI A21.51-76, "American National Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids".
2. AWWA C150-76 and ANSI A21.50-76, "American National Standard for the Thickness Design of Ductile Iron Pipe".
3. AWWA C111-80 and ANSI A21.11-80, "American National for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings".
4. AWWA C115-75 and ANSI A21.15-75, "American National Standard for Flanged Cast-Iron and Ductile-Iron Pipe with Threaded Flanges".
5. AWWA C110-75 and ANSI A21.10-77, "American National Standard for Gray-Iron and Ductile-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids".
6. AWWA C104-80 and ANSI A21.4-80, "American National Standard for Cement-Mortar Lining for Cast-Iron and Ductile-Iron Pipe and Fittings for Water".

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer, three (3) copies of descriptive literature on ductile iron pipe, fittings and jointing prior to ordering.

PART 2 - PRODUCTS

2.01 DUCTILE IRON PIPE

- A. Pipe shall have a working pressure of 350 psi.
- B. Pipe shall be ANSI Thickness Class 50.
- C. Pipe shall be as manufactured by Clow or equal.

2.02 DUCTILE OR CAST IRON PIPE FITTINGS

- A. All fittings shall be manufactured for the size and pressure class of the pipeline in which they are to be used.
- B. All fittings shall be furnished complete with all joint accessories.

2.03 DUCTILE IRON PIPE PUSH-ON JOINTS

- A. Joints in mains shall be push-on type with belled end and gasket.
- B. Joints shall have 350 psi working pressure rating.
- C. Joints shall be Clow Super Bell-Tite Joint or equal.

2.04 DUCTILE IRON PIPE FLANGED JOINTS

- A. In buildings or where shown on the plans, flanged jointing shall be required.
- B. All buried ductile iron pipe shall have standard cement lining on the inside and bituminous coating on the outside.
- C. In buildings, ductile iron pipe shall have an epoxy-based exterior paint coating (8-10 mil thickness) and either a cement or epoxy-phenolic interior lining.

PART 3 - EXECUTION

3.01 TRENCHING, BACKFILLING AND COMPACTION

- A. Trenching, backfilling and compaction shall conform with Sections 02221 of these specifications.

3.02 JOINTING

A. Jointing shall be per manufacturer's recommendations and in accordance with Section 15064, Article 3.02.

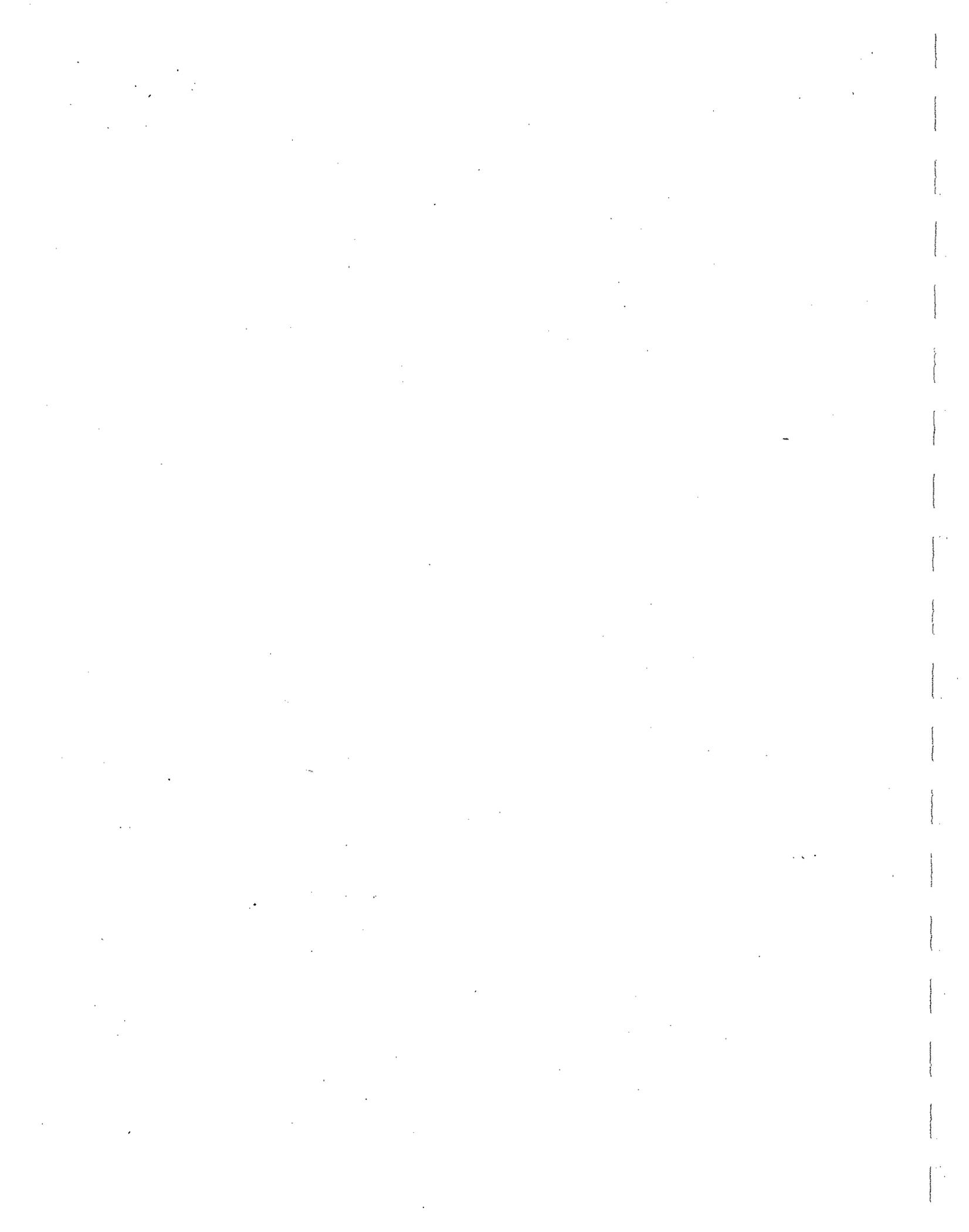
3.03 PRESSURE TESTING

A. Hydrostatic testing of cast iron and ductile iron fluid pipe is required and shall be in accordance with AWWA C106 for pipe cast in metal molds and C108 for pipe cast in sand lined molds.

3.04 DISINFECTION

A. Disinfection shall be conducted in accordance with procedures outlined in Section 15064, Article 3.04.

END OF SECTION



SECTION 15064

PLASTIC PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Plastic pipe shall be used as shown on the drawings.
- B. Related Work Specified Elsewhere:
 - 1. Trenching, Backfilling and Compaction: Section 02221

1.02 QUALITY ASSURANCE

- A. Polyvinyl Chloride (PVC) pipe shall satisfy the following standards:

- 1. ASTM D 1784 concerning PVC extrusion compound cell classification.
- 2. ASTM D 2254, "PVC Plastic Pipe (SDR-PR)".
- 3. ASTM D 2672, "Bell-End PVC Pipe"
- 4. National Sanitation Foundation "Seal of Approval Listing of Plastic Materials, Pipe, Fittings and Appurtenances for Potable Water and Wastewater".
- 5. Pipe jointing shall meet the following requirements:
 - (a) Integral bell gasketed joints shall be laboratory tested in accordance with Section 4, Laboratory Performance Requirements as defined in Uni-Bell Recommended Standard, UNI-B-1, Thermoplastic Pipe Joints, pressure and non-pressure applications.

- B. Polyvinyl chloride (PVC) C 900 Class 150 or Class 200 pipe shall satisfy the following standards:

- 1. AWWA C 900, Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch for water, which references ASTM and NSF Standards, for pipe couplings and jointing materials.

- C. Polyethylene pipe shall be NSF approved, SDR 13.

- D. Applicable standards may be obtained at the following addresses:

- 1. American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103
(215) 569-4200
- 2. National Sanitation Foundation
P.O. Box 1468
Ann Arbor, Michigan 48106
(313) 769-8010

3. Uni-Bell Plastic Pipe Association
2655 Villa Creek Drive, Suite 164
Dallas, Texas 75234
(214) 243-3902
4. American Water Works Association
6666 West Quincy Avenue
Denver, Colorado 80235

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer for approval, three copies of data sheets on the selected plastic pipe as well as fittings and adapters prior to ordering and shipment of materials to the site.

PART 2 - PRODUCTS

2.01 PVC PIPE

A. Where Class 160 PVC pipe is shown on the plans, pipe shall be ASTM D 2241, SDR 26. Class 200 PVC pipe shall be SDR 21. Where C 900 DR 18 and C 900 Class 200 PVC pipe shall be DR 14.

B. Pipe shall have standard 20 or 40 foot lengths.

C. Integral bell jointing is required. Gaskets shall be factory-installed unless otherwise approved. When not factory-installed, gaskets shall be furnished by the pipe manufacturer.

D. Pipe shall be as manufactured by RobinTech, Johns-Manville, Clow or equivalent.

2.02 PVC FITTINGS

A. All ells, bends, reducers and tees and other fittings shall be mechanical joint ductile iron as recommended by the pipe manufacturer.

B. The dry fit of fittings and coupling sockets must be snug.

C. Elbows and bends shall be long radius.

2.03 LUBRICANT

A. Lubricant to be applied to bevelled spigot end prior to insertion into belled end of pipe shall be as provided or recommended by the pipe manufacturer.

2.04 ADAPTERS

- A. Adapters shall be required for connecting PVC pipe to dissimilar piping materials; subject to approval by the Engineer.
- B. Transition gaskets shall be used to connect ductile iron ells, bends, tees and reducers to PVC pipe.

2.05 TRACER WIRE

- A. An electrically conductive insulated tracer wire (#14 solid copper or detectable marking tape) shall be placed alongside the main line PVC pipe for its entire length marking tape shall be installed as per manufacturer's recommendations.

PART 3 - EXECUTION

3.01 TRENCHING AND PIPE LAYING

- A. Trenchwork shall conform to Section 02221 of these specifications.

3.02 JOINTING

- A. The assembly of the gasketed joint shall be performed as recommended by the pipe manufacturer.
- B. In all cases, clean the gasket, the bell or coupling interior, and the spigot area with a rag, brush or paper towel to remove any dirt or foreign material before assembling.
- C. Inspect the gasket, pipe spigot bevel, gasket groove and sealing surfaces for damage or deformation. Reject damaged materials.
- D. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Then push spigot end "home" until the reference mark contacts the bell.

3.03 HYDROSTATIC TESTING

- A. The PVC line shall be capped and hydrostatically tested in conformance with requirements of AWWA C 600.
- B. Prior to the test, the Contractor shall have taken the necessary steps to remove all dirt, debris and obstructions from the pipelines.

C. Where leaks are visible at exposed joints and/or evident on the surface where joints are covered, the joints shall be remade or bolts retightened or the section of pipe re-laid, and the leakage eliminated. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the Contractor's expense.

D. Each completed section of the pipeline shall be tested at maximum working pressure for two hours. Care shall be taken to ascertain that all air has been expelled from the line prior to the test. "Allowable Leakage During Pressure Testing" shall be in accordance with the acceptable standards of the regulatory agency involved.

3.04 DISINFECTION

A. No water piping installed shall be placed in service, either temporarily or permanently, until it has been thoroughly disinfected as follows:

1. After testing, a solution of hypochlorite, (HTH, or approved equivalent) shall be introduced into the section of piping to be disinfected, sufficient to insure a chlorine dosage of at least 50 ppm in the pipe. While the solution is being applied, the water should be allowed to escape at the ends of the section until tests indicate that a dosage of at least 50 ppm has been obtained throughout.

2. The lines shall be kept full of the chlorinated solution for a period of 24 hours, with a residual concentration at the end of this period of at least 25 ppm. If the initial introduction of chlorine in concentration of 50 ppm or more does not produce a residual concentration of 25 ppm at the end of 24 hours, the disinfection procedure must be repeated. The mains shall then be thoroughly flushed with water from the municipal treated water system and then connected into the system. Disinfection operations shall at all times meet the current requirements of the Kentucky Division of Water.

B. Tablets may be substituted for solution disinfectant.

C. In the disinfection of PVC lines, care should be taken to follow the manufacturer's recommendations so as not to damage the pipeline.

D. Disinfection procedures shall conform to AWWA C 601-68, "AWWA Standard for Disinfecting Water Mains".

END OF SECTION

SECTION 15080

WATER SERVICE LINES AND TAPS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Unless otherwise indicated in the Contract Documents, "Summary of Work", all work installed under this section shall be as follows:

1. The materials and products shall be furnished and paid for by the Owner.
2. Installation of all items of work shall be performed by and paid for by the Owner.

B. Work Installed

1. Taps to water main including tapping saddles, corporation stops, "quicktaps", adapters, etc.
2. Service line, including push-unders (road crossings)
3. Meter assemblies, including meters, meter setters, meter boxes and pressure regulators (where used).

C. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Pipe Boring and Jacking: Section 02224

PART 2 - PRODUCTS

2.01 QWIKTAPS

A. Dresser Qwiktaps or equal, shall be used for tapping PVC pipe. Tap shall be 3/4 inch or as noted on drawings.

2.02 TAPPING SADDLE

A. Taps to any ductile iron pipe shall be by tapping saddle and corporation stop. Tapping saddles for PVC pipe may be used in conjunction with corporation stops in lieu of dresser Qwiktaps.

B. Tapping saddle for PVC shall be Clow Style 3401 Twin-Seal or equal. Tap shall be 3/4 inch or a necessary to conform to service line size.

C. All tapping saddles shall have AWWA C 800 (Mueller) threading. Bolts shall be rust-proof.

2.03 CORPORATION STOPS

A. Corporation stops shall be used in conjunction with tapping saddles.

B. Corporation stops shall be 3/4 inch by 3/4 inch, or as required for the service line size.

C. Inlet shall have AWWA thread to match tapping saddles and outlet shall have a connection appropriate for the service line to be used.

D. Corporation stops shall be Mueller H-15000, Ford F-600, or equal.

2.04 POLYETHYLENE PIPE

A. Polyethylene pipe shall be copper tube size (OD ASTM D 2739), SDR 9, PE 3406.

B. Pipe shall be 3/4 inch unless otherwise provided during construction.

C. Pipe shall have 160 psi working pressure at 73.4 degree F.

D. Pipe shall be Driscopipe 5100 ULTA-LINE or equal.

2.05 POLYBUTYLENE PIPE

A. Polybutylene pipe shall be copper tube size (OD ASTM D2739, SDR 9, or 13.5).

B. Pipe shall be 3/4 inch unless otherwise noted on the drawings.

C. Pipe shall have 250 psi working pressure at 73.4 degree F. (SDR 9) or 160 psi (SDR 13.5).

D. Pipe shall be Clow Polybutylene or equal.

2.06 COPPER PIPE

A. Pipe shall be standard 3/4 inch copper water service pipe.

B. Pipe shall have 160 psi working pressure at 73.4 degree F.

2.07 FITTINGS

A. All fittings and adapters, shall be as needed to perform the work.

2.08 METERS

A. Unless otherwise shown on the plans, meters 5/8" X 3/4", readings in gallons shall be used.

2.09 METER SETTERS

A. Meter setter for meter only shall be copper 5/8" X 3/4", horizontal inlet and outlet, with lock-wing stop, and with multi-purpose end connections on both inlet and outlet, such as Mueller Series H-14004 or equal (with check valve).

B. Meter setters for meter and pressure regulator shall be Tandem Copper setters with lock-wing stop, 5/8" x 3/4" with multi-purpose end connections on both inlet and outlet, and adapters for regulators, such as Ford TV72-15 or equal.

2.10 METER BOXES

A. Meter box shall be Lemac White Plastic Meter Box or standard black fiber meter box.

B. Meter boxes shall have 30-inch height, 18-inch diameter.

2.11 METER BOX LIDS

A. Meter box lids 18-inch diameter, 11-inch lid opening, 4-inch depth, cast iron, small opening nut, stamped WATER METER, such as Mueller H-10810 or equal.

2.12 PRESSURE REGULATOR AND STRAINER

A. Pressure regulator. if noted for installation, shall be diaphragm type, cast bronze, stainless steel seat ring with strainer, such as Mueller H-9300, regulator Number 2, size 3/4 inch or equal.

PART 3 - EXECUTION

3.01 QWIKTAP

A. Installation shall be in strict accordance with manufacturer's recommendations. In addition, the Engineer may require use of wrapping tape around service line insert to secure a tight fit if the need arises.

B. The Contractor shall leave slack in the service line near the tap to avoid pullout from water pressure forces.

3.02 TAPPING SADDLES AND CORPORATION STOPS

A. Saddles, corporation stops and connection to service pipe shall be installed so as to obtain positive seal.

3.03 SERVICE LINE

A. Trenching and backfilling shall conform to Sections 02221 and 02223 in all particulars, except that depth of bury shall be adjusted to slope gradually to meet the inlet hole at the meter box.

B. Road crossings shall be installed by pushing as per Section 02224 of these specifications.

3.04 METERS

A. Meters shall be installed in accordance with the Standard Detail WL 300.

B. All connections shall be watertight.

C. The meter setter shall be capped at the outlet inside the meter box.

D. The earth beneath the meter inside the meter box shall be flat and all loose dirt removed.

END OF SECTION

SECTION 15101

GATE VALVE ASSEMBLIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Work Specified Elsewhere:
1. Metal Pipe and Fittings: Section 15060
 2. Plastic Pipe and Fittings: Section 15064

1.02 QUALITY ASSURANCE

- A. All gate valves shall equal or exceed the requirements of AWWA C 500-80.

1.03 SUBMITTALS

- A. The Contractor shall submit to the Engineer, three copies of descriptive literature on all valves and valve boxes prior to ordering.

PART 2 - PRODUCTS

2.01 GATE VALVES

- A. Valves shall be AWWA Type Iron Body, Double Disc, Parallel Seat.
- B. Valve jointing shall be either mechanical joint for connection to iron and PVC pipe or "plastic end" for connection to PVC pipe.
- C. Valves shall be cast iron with bronze or other rust-proof mountings.
- D. Valves shall have minimum 150 psi working pressure, made by American, Mueller, Clow, Kennedy or as approved.
- E. All valves shall be ordered with the same kind and size of wrench. Adapter nuts shall be installed where necessary and the Contractor shall furnish three five foot long "tee" wrenches to the owner at no extra cost.

2.02 GATE VALVE BOXES

- A. Gate valve boxes shall be 5 1/4 inch, shaft, 2 piece, screw type or buffalo type, of cast iron construction.
- B. Valve boxes shall have an extension range of 24 to 36 inches.

C. Valve box covers shall be furnished by valve box manufacturer, with lid marked "WATER".

D. Valve boxes and lids shall conform to the manufacturing standards of Bingham and Taylor, Tyler or Mueller.

2.03 TAPPING VALVES AND ACCESSORIES

A. Branch or lateral connections to in-service mains shall be made without interrupting service at the locations indicated on the plans or as directed by the Engineer during construction.

B. The tapping valves shall meet the requirements of this section for gate valves. The tapping sleeve and/or tapping crosses shall be compatible with the valve used and pipe to be tapped.

C. The installation shall be made using the proper size drill in machine as per manufacturers recommendation and as directed by the Engineer during construction.

D. Adequately sized thrust blocks shall be constructed to prevent movement of the mains at the tapping location. (See Standard Detail WL 101).

E. Valve boxes and lids shall be in accordance with Section 2.02 above.

PART 3 - EXECUTION

A. All valves shall be installed where shown on the drawings per manufacturer's recommendation. Refer to Standard Detail WL 200.

END OF SECTION

SECTION 15121

WATER PRESSURE REGULATOR

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Specified Elsewhere:

1. Gate Valve Assemblies: Section 15101
2. Trenching, Backfilling and Compaction: Section 02221

B. Water pressure regulators shall be installed where noted on the drawings.

PART 2 - PRODUCTS

2.01 WATER PRESSURE REGULATORS

A. Water pressure regulators shall be Model 127W as manufactured by the Watts Regulator Company, Lawrence, Mass., or approved equal.

2.02 GATE VALVES

A. Gate valves shall conform to Section 15101 of these specifications.

2.03 BOXES

A. Boxes for housing the regulator installation shall be appropriate for the location:

1. In areas subject to traffic or farming activities, a concrete box with a cast iron lid shall be used.
2. In areas not subject to traffic as other hazards, an appropriately sized plastic meter box may be used with prior written approval of the Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

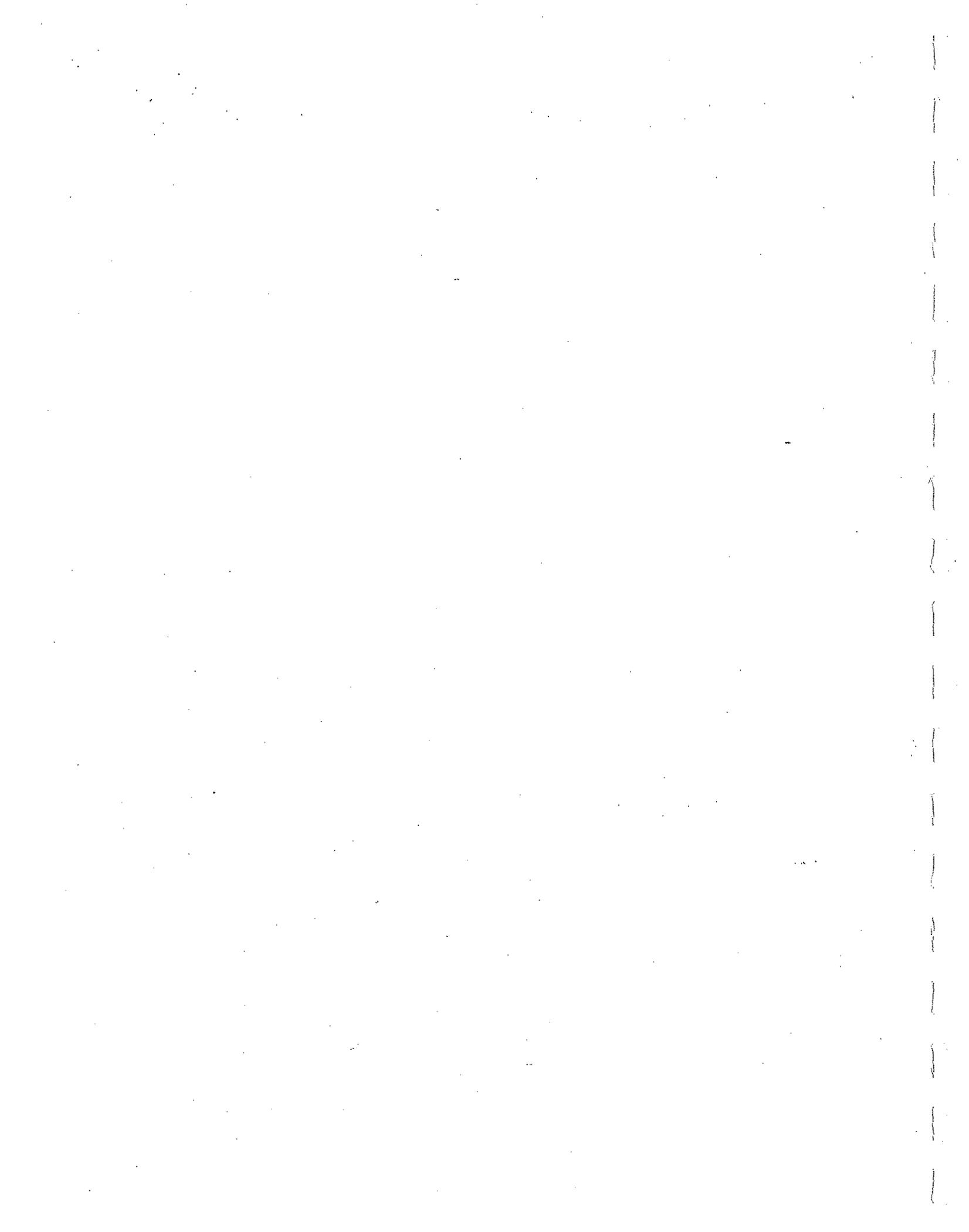
A. Water Pressure Regulators shall be installed and adjusted in accordance with the manufacturer's recommendations.

B. A gate valve is required both upstream and downstream of the regulator, or as directed by the Engineer.

C. Standard Details illustrate the configuration for the water pressure regulator installation.

END OF SECTION

15121 - 1



SECTION 15126

AIR VALVE ASSEMBLIES

PART 1 - GENERAL

1.01 SUBMITTALS

A. The Contractor shall submit to the Engineer, three (3) copies of the manufacturer's literature on air valves, 1 inch gate valves, and valve box covers, prior to ordering.

PART 2 - PRODUCTS

2.01 AIR VALVE

A. Valve shall have 150 psi working pressure, one inch inlet size N.P.T., 1/16 inch orifice.

B. Valve shall be two-way acting.

2.02 VALVE BOX

A. Valve box shall be 30 inch diameter standard strength reinforced concrete pipe meeting ASTM C76.

B. Valve Box (pipe) shall have bell top for receiving 30 inch diameter cover.

2.03 VALVE BOX COVER

A. Cover shall be round drainage grate perforated with eight 3/4 inch holes, such as Neenah Foundry Series R-4055 or approved equal.

2.04 TAP MATERIALS

A. Taps shall be by tapping saddle and corporation stop.

B. Tapping saddles on PVC pipe shall be Clow Style 3401 Twin Seal or equal, size 1 inch, AWWA threading.

C. Tapping saddle on ductile iron or permastran pipe shall be Clow Style 3407 or equal, size 1 inch, AWWA threading.

D. Corporation stop shall be 1 inch with AWWA inlet thread and outlet thread selected by Contractor to connect to male fitting between corporation stop and gate valve.

E. Fittings connecting the corporation stop to the gate valve and gate valve to the air valve, as needed, shall be 1 inch.

2.05 GATE VALVE

A. Gate valve shall be 1 inch bronze or brass with wheel handle, such as Mueller H-10914 or equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Underground installation shall be in accordance with Standard Detail WL 203. The Contractor shall install granular backfill (KY DOT No. 8, 9 or 57) per dimensions shown on the detail.

END OF SECTION

SECTION 15171

SAMPLE STATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Related Work Specified Elsewhere:
1. Water Service Lines and Taps: SECTION 15080
 2. Customer Water Assemblies: SECTION 15170
- B. Sample Station shall be installed at the location indicated on the drawings or as directed on construction. The Sample Station shall be either installed in conjunction with a Customer Water Meter Assembly or at an independent location as shown on the plans or as directed on construction.

PART 2 - PRODUCTS

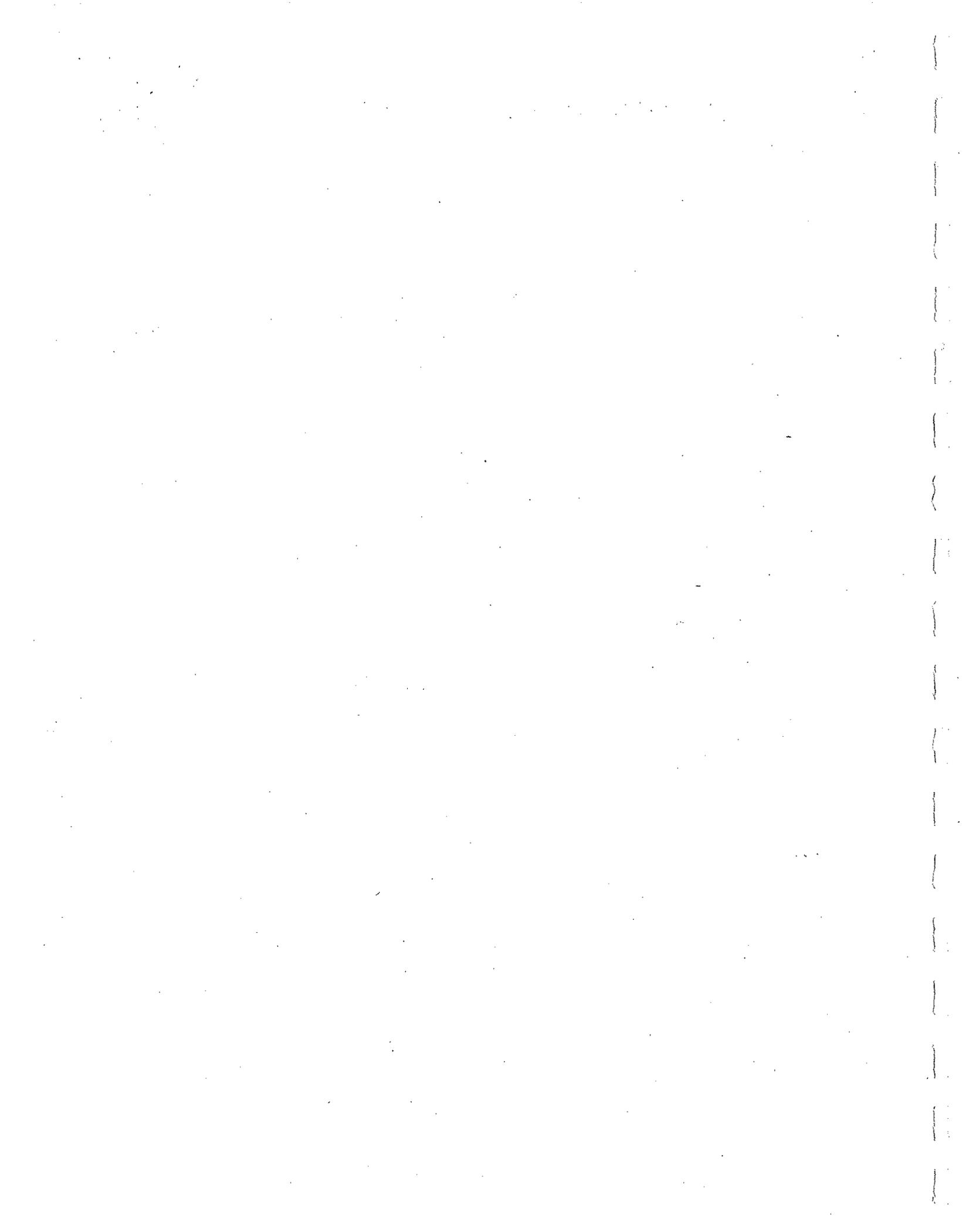
- A. The Sample Station shall be a Model #93-WM as manufactured by The Kupferle Foundry Company to be used in conjunction with a companion sampling rod.
- B. Meter Boxes, Meter Setters, Meter Box Lids shall be in accordance with Section 15170. Lines and taps shall be in accordance with Section 15080.

PART 3 - EXECUTION

3.01 GENERAL

- A. The sample station shall be installed at the location shown on the plans or as directed on construction.
- B. Installation shall be in accordance with the manufacturers recommendation and Standard Drawing No. WL 500.

END OF SECTION



SECTION 15425

BLOWOFF ASSEMBLIES

PART 1 - GENERAL

1.01 SUBMITTALS

A. The Contractor shall submit to the Engineer, three (3) copies of the manufacturer's literature on tapping saddles, assembly box (ie. meter box), box lid (drainage grate), 2-inch gate valve and 2" X 2" X 1" (3/4") tee permitting screw on hose bib, prior to ordering said materials.

PART 2 - PRODUCTS

2.01 TAPPING SADDLE

A. Tapping saddles shall be required when tapping 4-inch to 10-inch diameter mains.

B. On ductile iron, permastran or asbestos-cement mains, tapping saddle shall be Clow Style 3407, Mueller Series H-10521, or approved equal. Tap shall be 2-inch.

C. On PVC pipe, tapping saddle shall be bronze, screw type with large seat area and SBR gasket, such as Clow Style 3401 Twin-Seal Tapping Saddle or approved equal. Tap shall be 2-inch.

2.02 CORPORATION STOPS

A. Corporation Stops shall be used in conjunction with tapping saddles.

B. Corporation Stops shall be 2" X 2".

C. Inlet shall have thread to match tapping saddles and outlet shall permit direct compression coupling to copper size type polyethylene or polybutylene pipe.

D. Corporation Stops shall be Mueller H-25000, Ford F600, or equal.

2.03 TEE CONNECTION TO MAIN

A. A tee fitting installed in the main will be required when connecting to 2-inch to 3-inch "main" lines.

B. Unless otherwise approved, tee shall be molded PVC tee with adapters used to connect to dissimilar pipe materials, as necessary.

2.04 LATERAL PIPE TO BLOWOFF ASSEMBLY

A. The lateral pipe connecting the main to the blowoff assembly shall be 2-inch, 160 psi polyethylene or polybutylene pipe as defined in Article 2.04 of Section 15080. Where 200 psi pressure rating is required by the plans, lateral pipe shall be 250 psi polybutylene as defined in Article 2.05 of Section 15080. Galvanized iron pipe section shall have 2-inch male threads for connection to coupling and 2-inch gate valve.

2.05 GATE VALVE

A. Gate valve shall be bronze with wheel handle such as Mueller H-10914 or equal.

2.06 FITTINGS

A. A 2" X 2" copper to female iron pipe thread coupling shall be used to connect from copper tube size PE or PB pipe to 2-inch iron pipe with male I.P. threads.

B. A 2" X 2" X 1" or 2" X 2" X 3/4" tee shall be used inside the blowoff box. The 1-inch or 3/4-inch hose bib. The 2-inch outlet and 1-inch or 3/4-inch side shall be plugged by a screw cap.

C. The Contractor may substitute alternate fittings subject to approval, with the stipulation that 2-inch sizing is maintained from the tap to a capped drain, and a connection is provided for a 1-inch or 3/4-inch hose bib.

2.07 BLOWOFF ASSEMBLY BOX

A. Box shall be Lemac White Plastic Meter Box or standard black fiber meter box, 18-inch diameter, 30 inches deep.

2.08 BOX COVER

A. Box cover shall be round drainage grate Neenah R-4030, Clow F3810 or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Three cubic feet of rounded stone (KY DOT Number 8, 9 or 57) shall be placed beneath the blowoff assembly box and extending

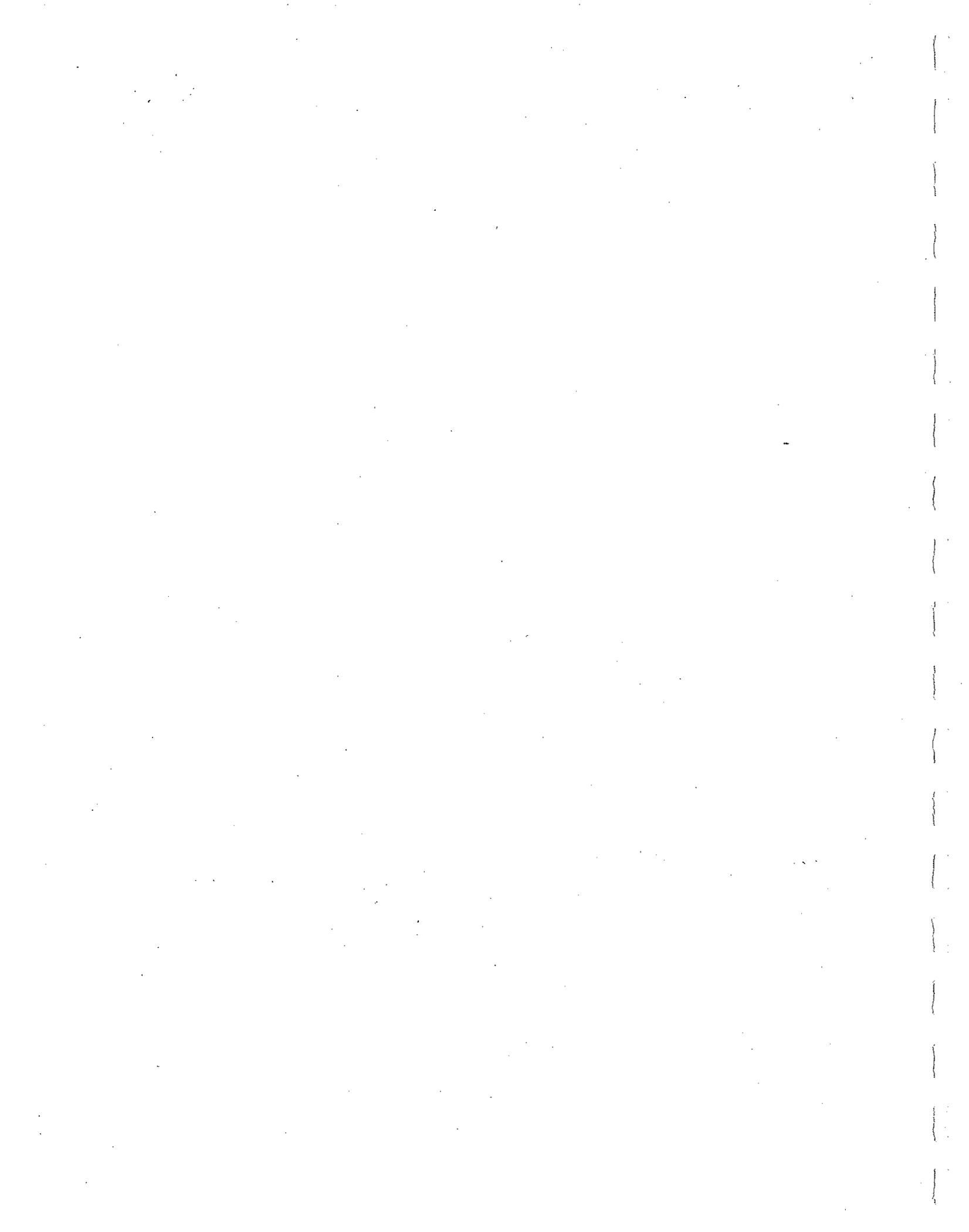
beneath a concrete thrust block at the inlet to the box. Depth of placement shall be minimum 15 inches Stone shall be levelled and tamped.

B. A minimum one cubic foot concrete thrust block shall be poured at the inlet to the box, with minimum 8 inches of contact with a 2-inch galvanized pipe placed through the concrete.

C. If PVC molded tee fitting is used at the connection to 2-inch to 3-inch size mains, installation shall be per manufacturer's recommendations.

D. Installation shall be in accordance with Detail WL 204.

END OF SECTION



SECTION 15530

FIRE HYDRANT ASSEMBLIES & FLUSH HYDRANT ASSEMBLIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements of this section apply to the purchase and installation of fire hydrant assemblies, flush hydrant assemblies and required accessories and appurtenances.

B. Related Work Specified Elsewhere:

1. Trenching, Backfilling and Compaction: Section 02221
2. Roadway Trenching, Backfill, Compaction and Pavement Replacement: Section 02223
3. Pipe Boring and Jacking: Section 02224
4. Plastic Pipe and Fittings: Section 15064
5. Gate Valve Assemblies: Section 15101
6. Metal Pipe and Fittings: Section 15060
7. Cast-In-Place Concrete: Section 03300

1.02 QUALITY ASSURANCE

A. Quality Assurance shall be provided by the Owner - observation and testing by the Engineer.

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer three copies of the descriptive literature for the hydrant assemblies and accessories and appurtenances, before they are ordered.

PART 2 - PRODUCTS

2.01 FIRE HYDRANT ASSEMBLIES AND FLUSH HYDRANTS

A. Fire hydrant assemblies shall be Mueller Centurion fire hydrants model A423, conforming to AWWA Standard 502 or equal as approved by the engineer and shall conform to the following requirements.

1. Have a main valve opening of 5 1/4 inches.
2. Operating pressure equal to 150 psi and tested to 300 psi.
3. Have two 2 1/2 inch diameter hose nozzles and one 4 1/2 inch diameter pumper hose nozzle. All nozzles to have National Standard Firehose Thread.
4. Each assembly shall be equipped with a safety flange and safety stem coupling to minimize impact damage.

5. The operating nut shall be 1 1/2 inch standard pentagon shape and shall open the main valve when turned in the counter clockwise direction.
6. Automatic hydrant drains are required.
7. Hydrant caps to be provided with chains attached to the hydrant.
8. The hydrant body shall be fire hydrant red and the hydrant bonnet shall be silver. The paint shall be applied by the manufacturer with "touch up" in the field by the Contractor.
9. The hydrant shoe inlet opening shall be six inches I.D. and of the slip-on type, unless otherwise noted on the drawings.
10. The length of the extension barrel required shall be determined for each installation. The barrel shall be coated with a pitch tar varnish to prevent corrosion.
11. All accessories shall be from the same manufacturer as the hydrant.

B. Auxiliary gate valves shall conform to Section 15101 of these specifications.

C. Flush Hydrants

1. Flush hydrants shall be the "Eclipse No. 2 - Tamper Proof" (above grade) or Eclipse #85 (below grade) as manufactured by the John C. Kuperferle Foundry, or approved equal.
2. The hydrant shall be equipped with a 2 1/2 inch nozzle(s) with "Natural Standard Firehose Thread".
3. The hydrant inlet shall be three inches I.D. and of the mechanical joint type unless otherwise noted on the drawings.
4. The length of the extension barrel required shall be determined for each installation. The barrel shall be coated with pitch tar varnish to prevent corrosion.
5. Appropriate operating wrenches shall be provided in the numbers called for in the contract.

PART 3 - INSTALLATION

A. Fire Hydrants and Flush Hydrants

1. Hydrants shall be installed where indicated on the drawings.
2. Hydrants shall be installed vertically and according to the Standard Drawing WL 201 and/or WL 202 of these specifications and according to the manufacturer's recommendations.

B. Auxiliary Valves shall be installed where indicated on the drawings and according to the Standard Detail on the drawings and Section 15101 of these specifications.

C. Concrete Thrust Blocks

1. Concrete for concrete thrust blocks shall be Class "B" conforming to Section 03300 of these specifications.

2. Concrete thrust blocks shall be of the appropriate configuration and have the required bearing area against undisturbed soil as determined by Standard Drawing WL 101.

PART 4 - TESTING

A. Hydrants and auxiliary gate valves shall be pressure tested in conjunction with the testing of the water mains, no leakage will be allowed.

B. Hydrants and auxiliary gate valves shall be operated at maximum operating pressure to determine that they are functioning properly. Any problems with the functioning of the hydrants or valves shall be corrected by the Contractor prior to final acceptance of the work.

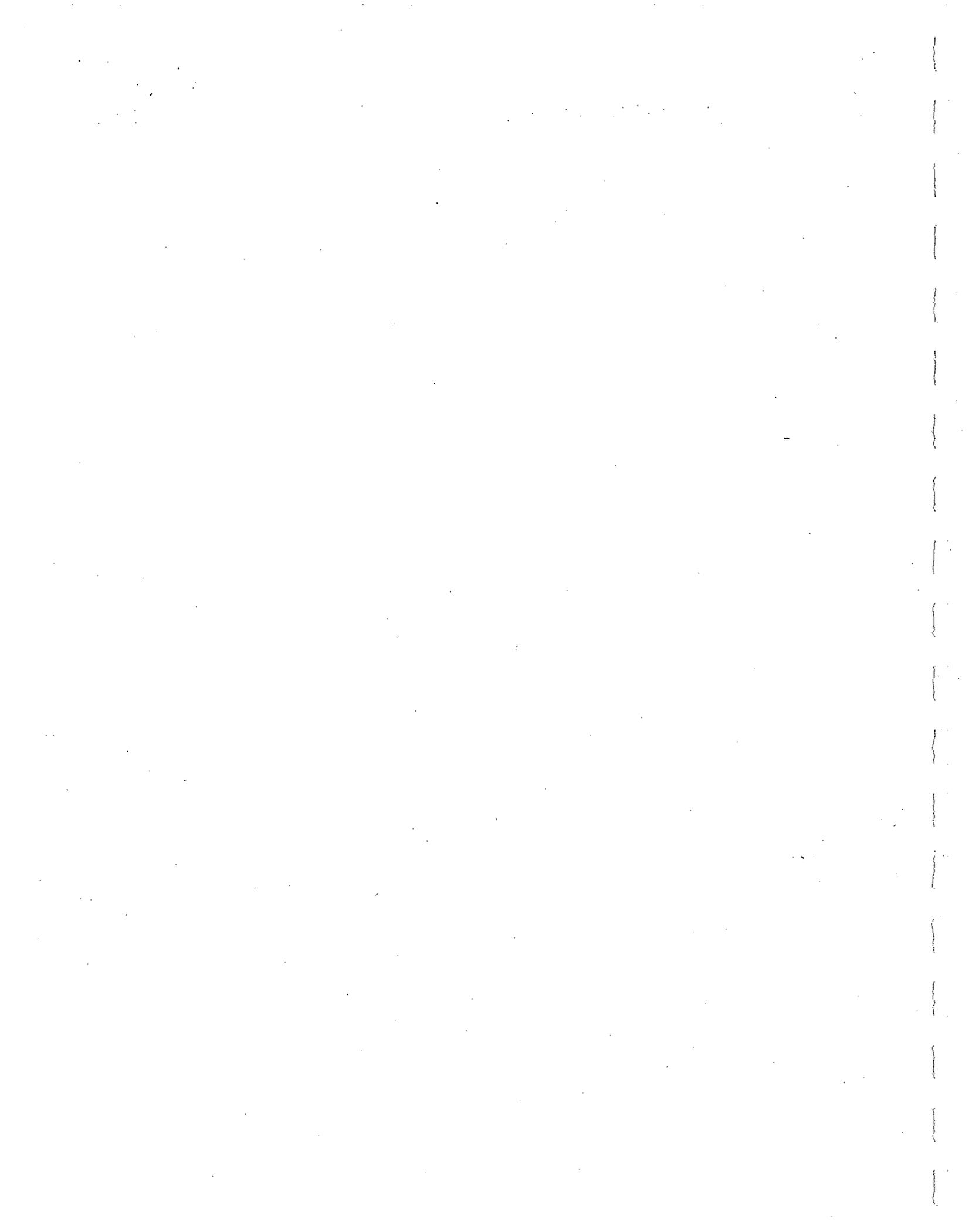
END OF SECTION

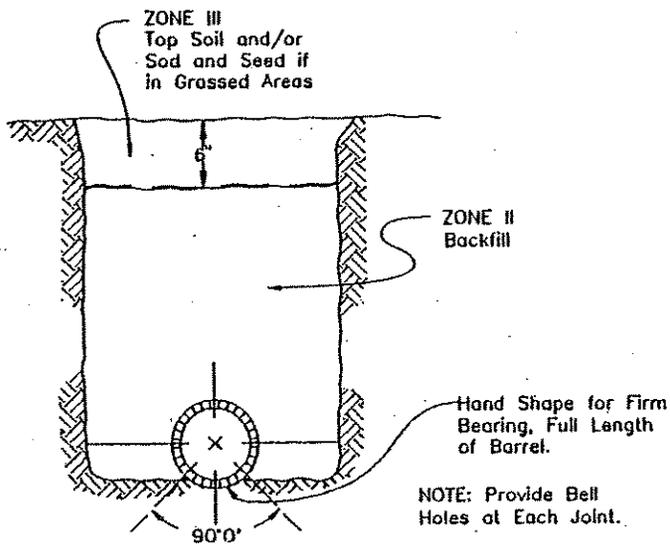


SECTION 50000

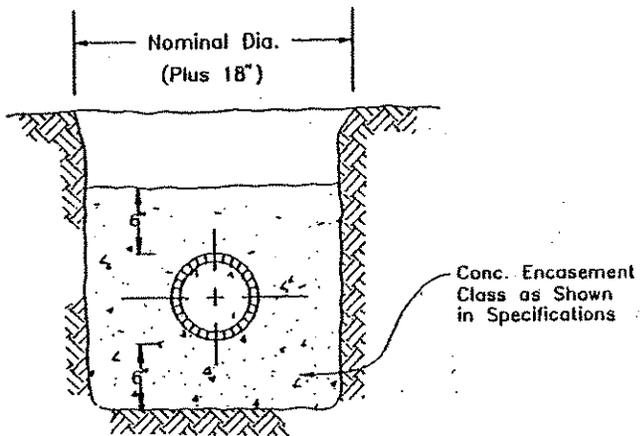
STANDARD DRAWINGS - WATER LINE

WATER LINE BEDDING & BACKFILL	WL 100
THRUST BLOCKS	WL 101
INSTALLATION DETAIL - UNDER FIELD TILE	WL 102
PAVEMENT BEDDING & PLACEMENT	WL 103
STREAM CROSSING BEDDING & PLACEMENT	WL 104
TYPICAL HIGHWAY/ROAD CROSSING DETAIL	WL 105
GATE VALVE ASSEMBLY	WL 200
FIRE HYDRANT ASSEMBLY	WL 201
FLUSH HYDRANT ASSEMBLY	WL 202
AIR VALVE ASSEMBLY	WL 203
TYPICAL BLOWOFF	WL 204
PRESSURE REDUCING VALVE (PRV) ASSEMBLY	WL 205
SAMPLE STATION	WL 500

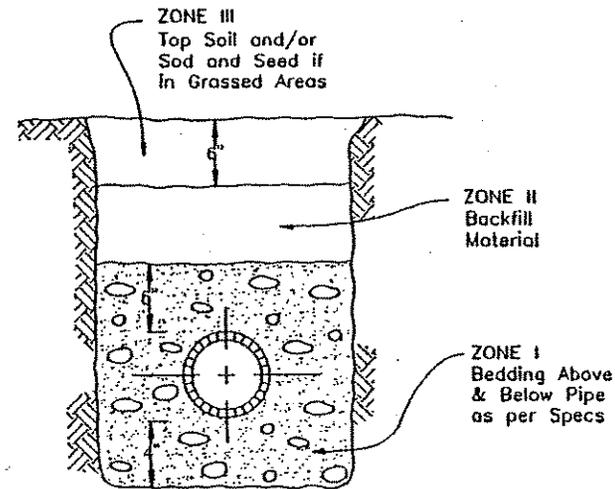




EARTH BACKFILL/BEDDING



CONCRETE ENCASEMENT



GRANULAR BEDDING

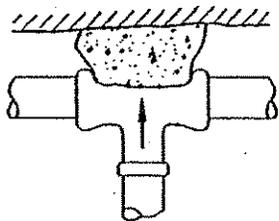
NOTES

1. Granular Bedding to 6" below pipe shall be placed in all Solid Rock trenches.
2. Zone II Backfill:
 - (a) Backfill to 12" above pipe shall be hand placed with No Rocks.
 - (b) Backfill at street & roadway crossings and at locations shown on the plans shall be compacted in 6" layers to the full trench depth, as per specifications.
3. No rock allowed in Zone III Backfill.

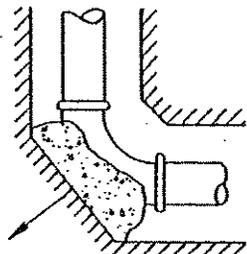
DETAILS FOR TRENCHING, LAYING
AND BACKFILLING OF WATER PIPE

NOT TO SCALE

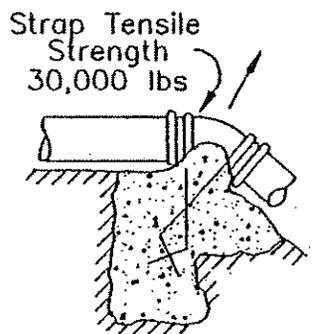
Std. Drawing No. WL 100



"A"

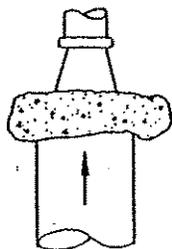


"D"



UP DIRECTIONAL
CHANGE APPLICATION

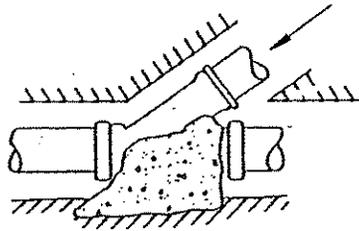
"B"



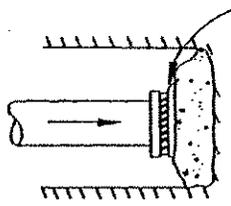
REDUCER

"E"

16 Gauge Metal
Plate Behind Plug



"C"



"F"

→ DENOTES FORCE

ESTIMATED SOILS BEARING VALUES

SOIL TYPE	LBS/FT ²
Muck, Etc.	0
Soft Clay	500
Sand	1,000
Sand & Gravel	1,500
Sand & Gravel w/ Clay	2,000
Sand & Gravel (Cemented w/ Clay)	4,000
Hard Pan	5,000

Calculate the thrust block bearing surface (FT²) required on undisturbed soil.

THRUST FORCES PER 100 psig

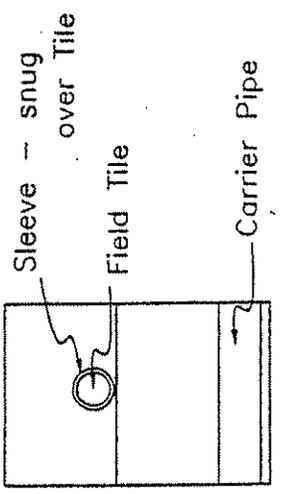
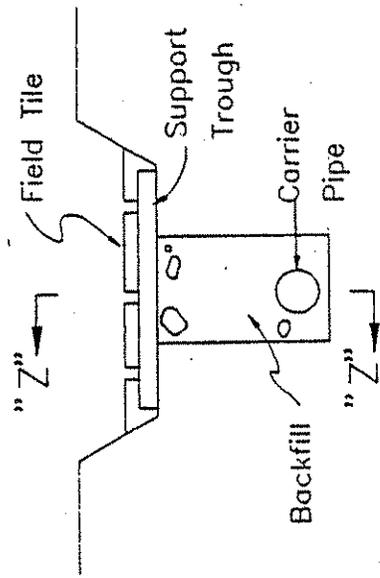
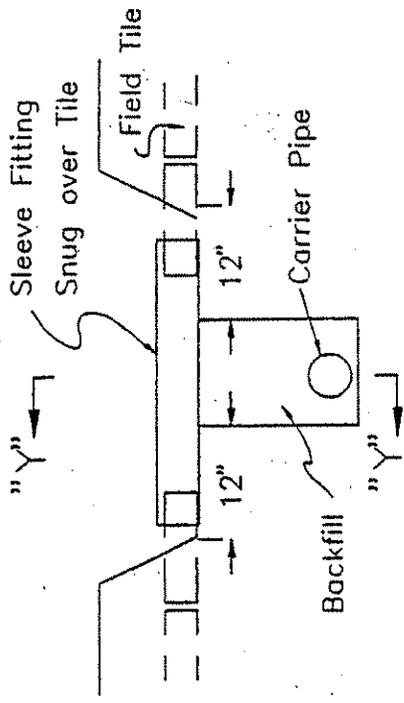
PIPE SIZE	90° ELL	45° ELL	VALVES, TEES DEADENDS
1-1/2	300	200	200
2	500	300	400
3	1,000	600	800
4	1,800	1,100	1,300
6	4,000	3,300	2,900
8	7,200	4,100	5,100
10	11,200	6,300	7,900
12	16,000	9,100	11,300

NOTE: Conc. Class as per specifications.

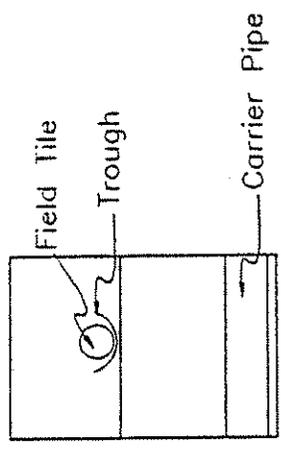
CONCRETE THRUST BLOCKS & PLUGS
SECTIONS A - F

NOT TO SCALE

Std. Drawing No. WL 101



SECTION "Y-Y"



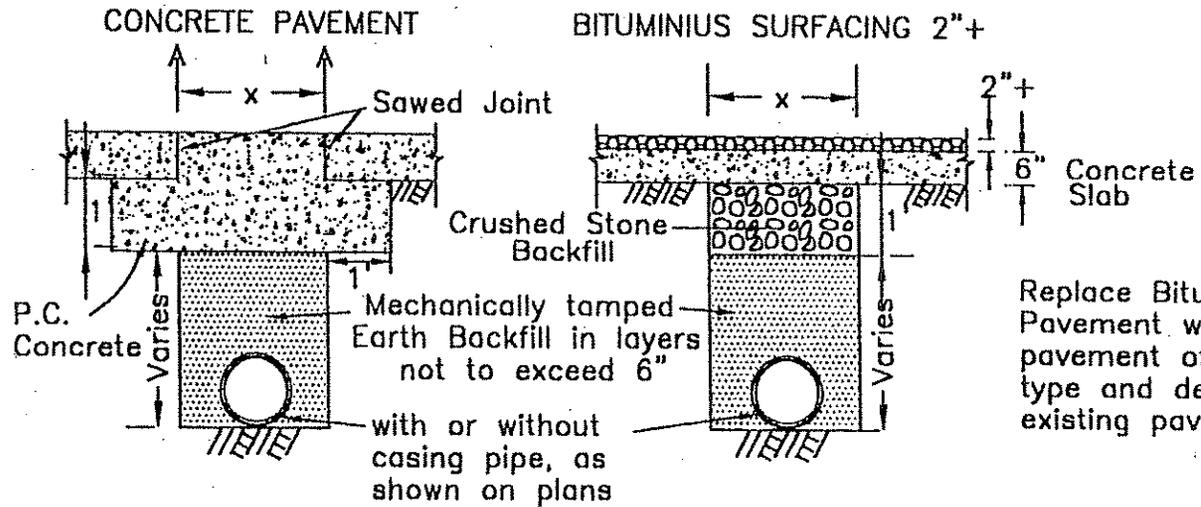
SECTION "Z-Z"

CROSSING UNDER FIELD TILE

NOT TO SCALE

Std. Drawing No. WL 102

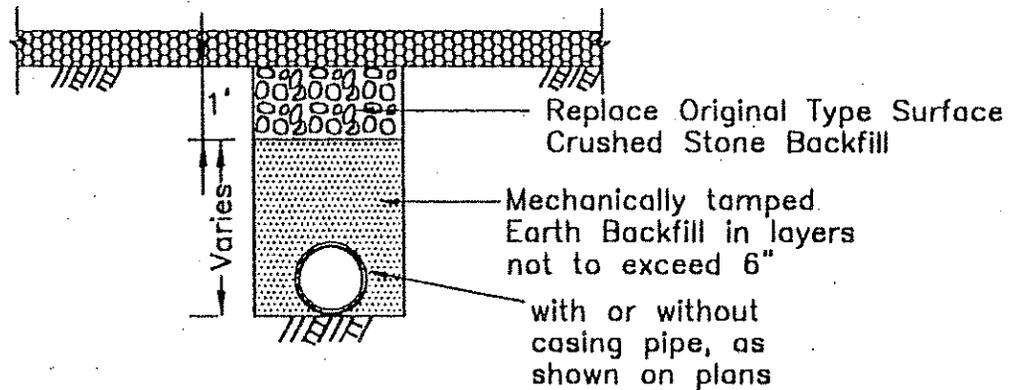
X=Width of Excavation



Replace Concrete Pavement w/ new pavement of same type and depth of existing pavement.

Replace Bituminous Pavement w/ new pavement of same type and depth of existing pavement.

BITUMINIOUS SURFACE LESS THAN 2" & TRAFFIC BOUND MACADAM



Note: From Points "A" (Concrete Pavement) distance to nearest joint or break in pavement must be six (6) feet or more. If less than six (6) feet, remove pavement to joint or break and replace entire slab.

Concrete slab under Bituminous surface to exceed 12 inches on each side to ditch.

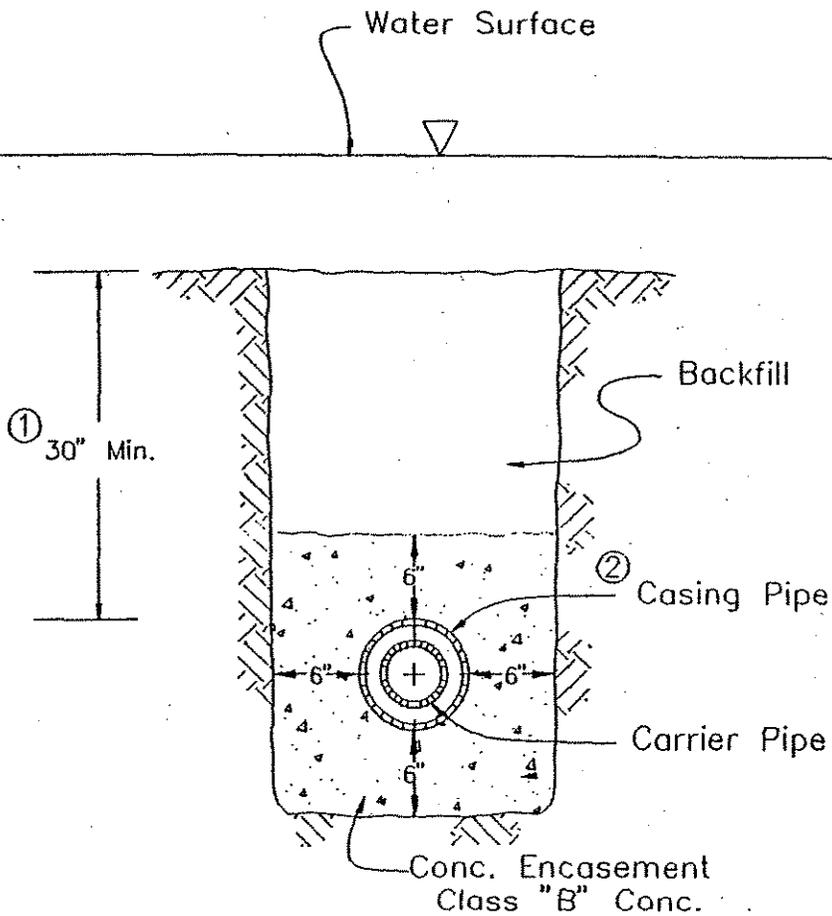
For backfill density requirements see Section 02221 - 2.06E.

For Flowable Backfill See Section 02223 "S"

OPEN-CUT CONSTRUCTION
PAVEMENT REPLACEMENT & BEDDING
FOR CONCRETE & BITUMINOUS SURFACES

NOT TO SCALE

Std. Drawing No. WL 103



STREAM CROSSING DETAIL
(SUBFLUVIAL FLOW)

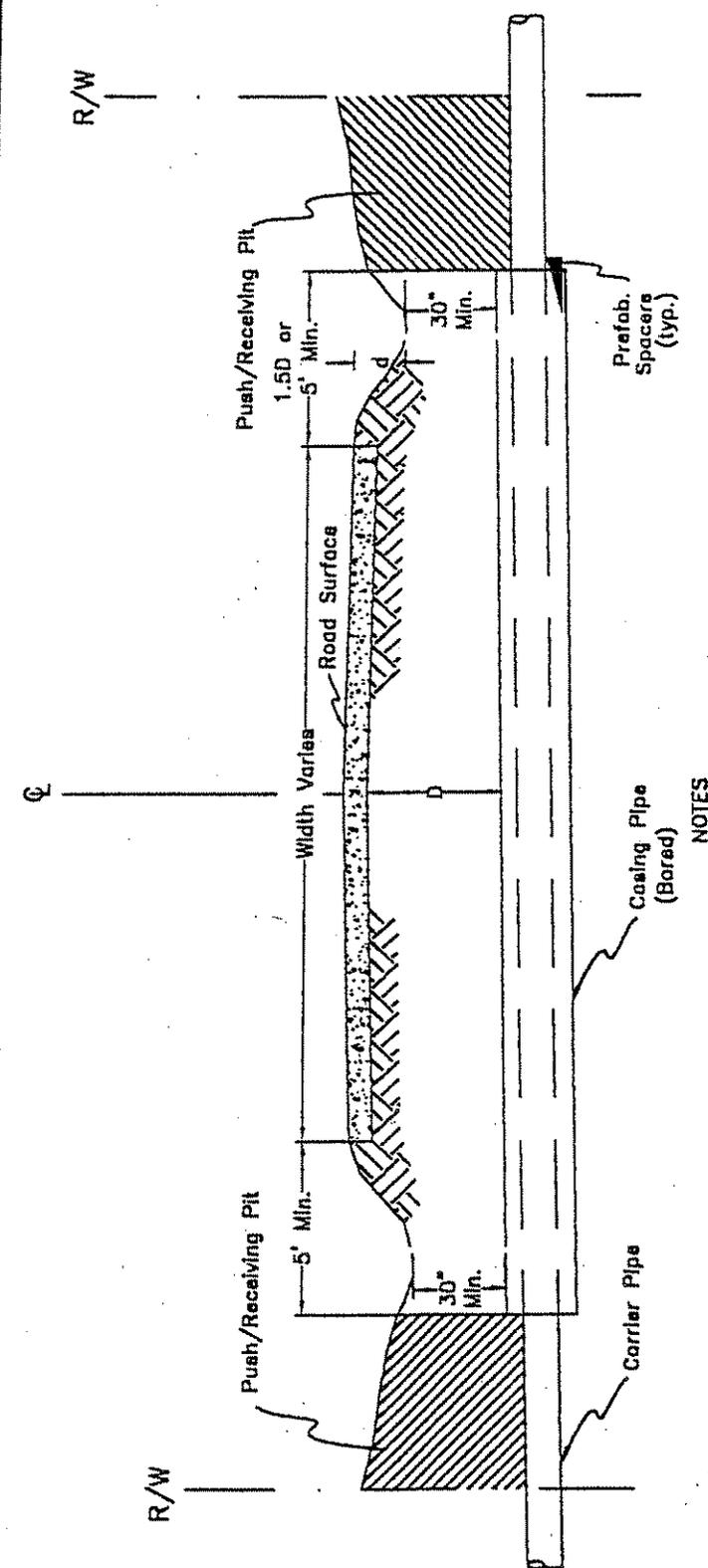
NOTES

- ① For non-erodible Channels (Rock) the min. clear cover may be 6" (Conc.)
- ② The crossing may be with ~~or~~ without casing Casing pipe may be PVC.
- ③ The trench shall be backfilled as closely as possible to the original contour. All excess material shall be disposed of outside of the floodplain.
- ④ Any material placed for construction (pads, coffer dams, etc.) shall be removed immediately following trench closure.

STREAM CROSSING DETAIL
FOR TRENCHING, LAYING
AND BACKFILLING OF WATER LINE

NOT TO SCALE

Std. Drawing No. WI 104



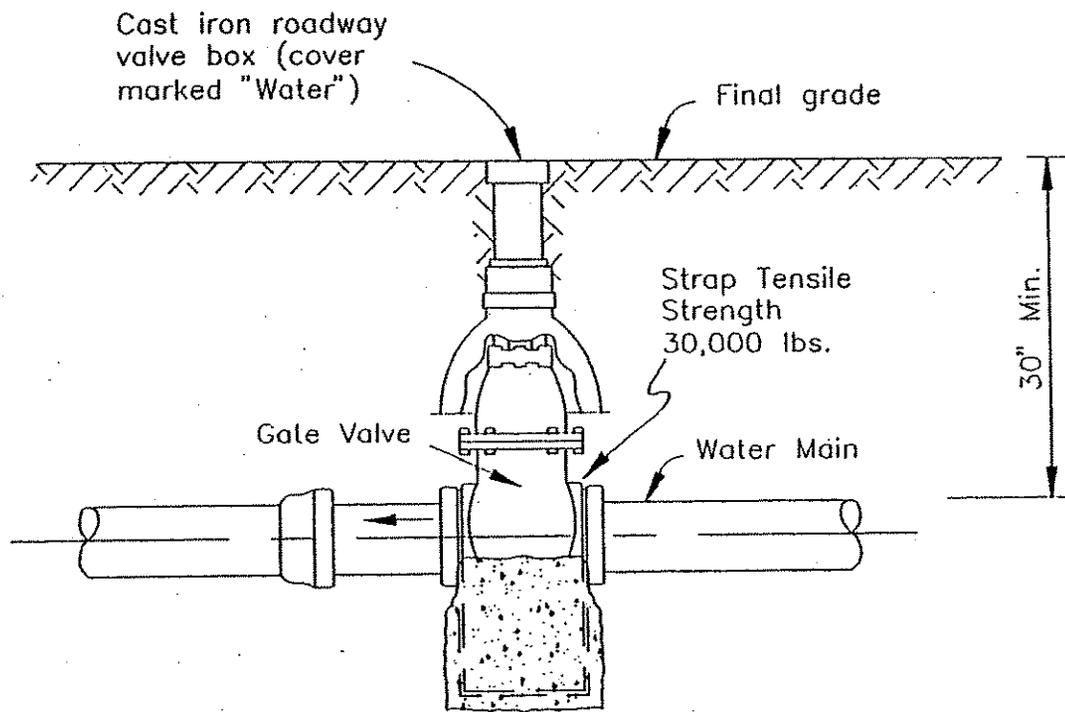
NOTES

1. d = Depth of Ditch below Road Surface.
 $D = d + 30"$ min./or equal to Depth of Pipe below Road Surface.
2. Extend Casing beyond Ditch Lines.
3. All Ditch Lines are to be left open.
4. Push & Receiving Pits are to be Compacted & Backfilled as directed by the Engineer.
5. For installations using Steel Casing & PVC Carrier, Prefab. Spacers shall be installed - See Specifications.
6. Seed & straw all area disturbed during constr.

TYP. HWY / RD BORING CROSSING DETAIL

SCALE: 1" = 5'

Std. Drawing No. WI. 105

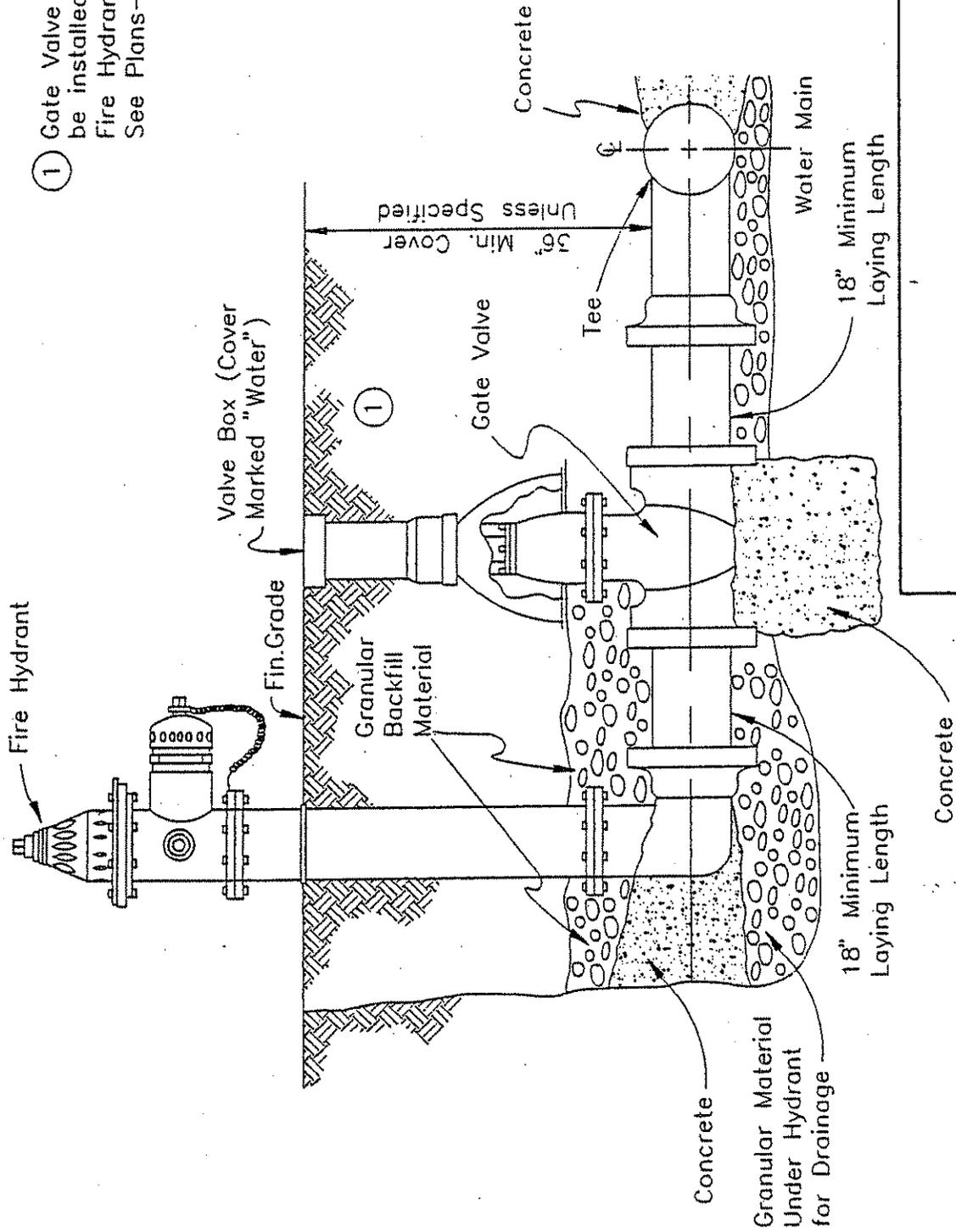


GATE VALVE SETTING

NOT TO SCALE

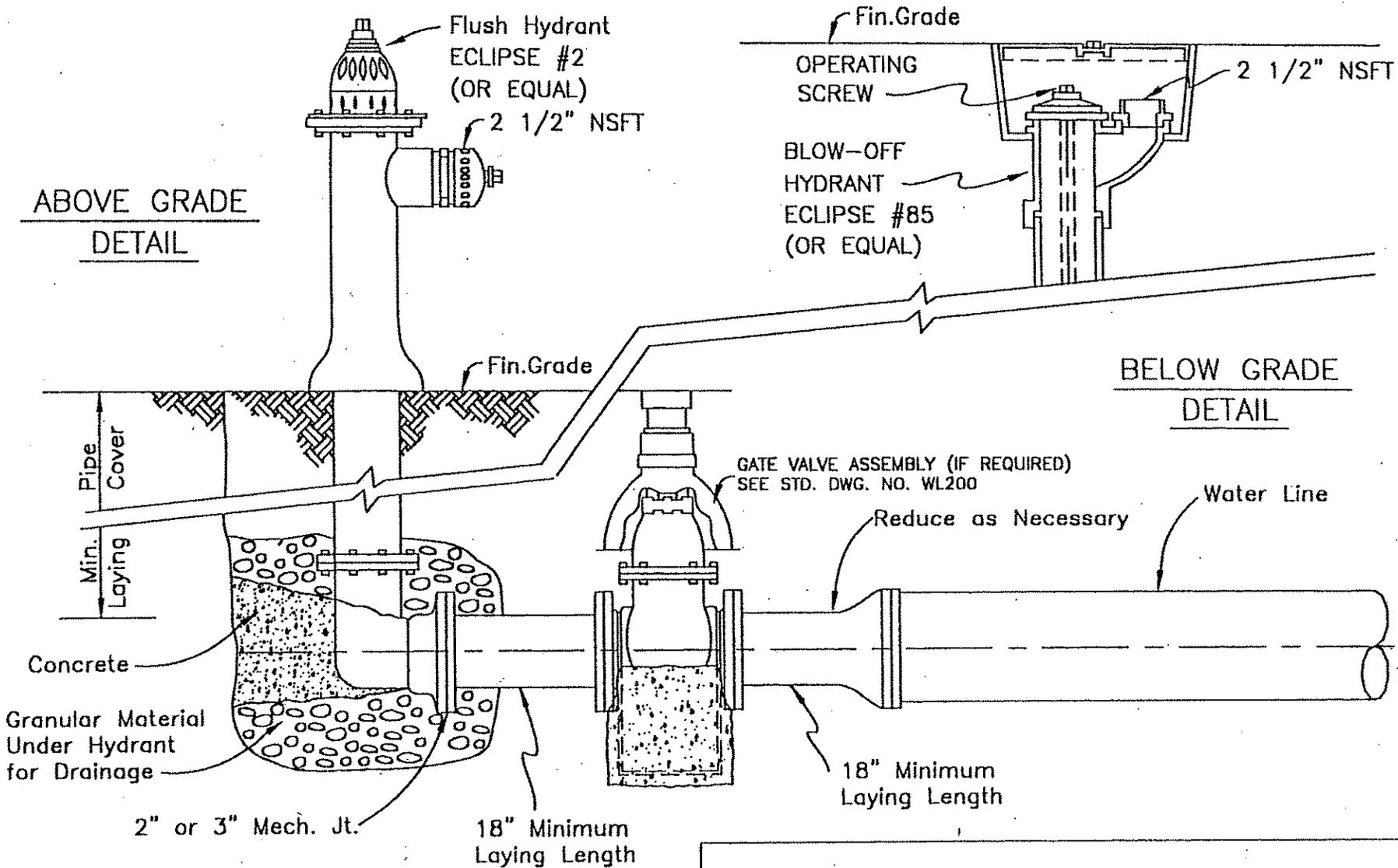
Std. Drawing No. WI. 200

① Gate Valve may not be installed with Fire Hydrant Assembly See Plans—



FIRE HYDRANT ASSEMBLY

Hydrant Drain to be Left Clear and Operable

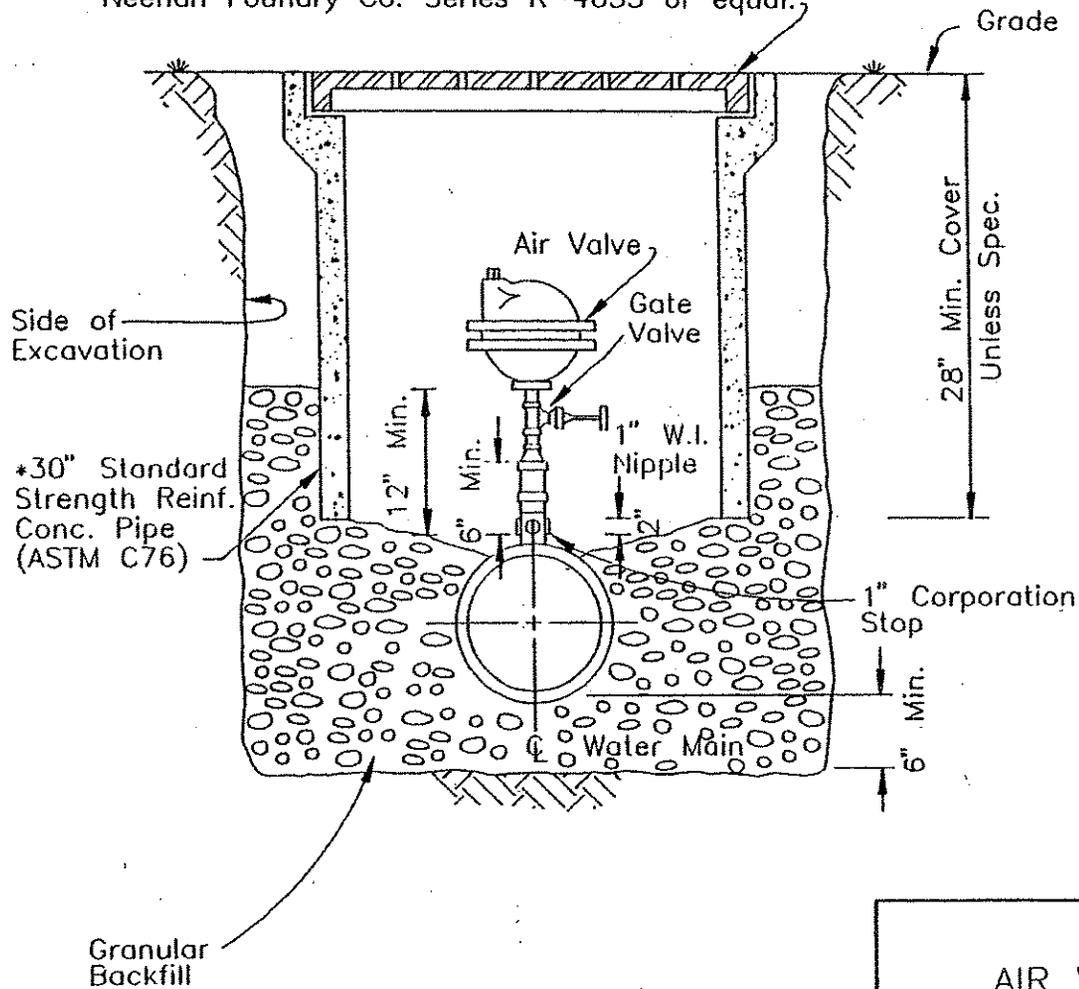


Hydrant Drain to be
Left Clear and Operable

FLUSH HYDRANT ASSEMBLY

NOT TO SCALE	Std. Drawing No. WL 202
--------------	-------------------------

* Round drainage grate perforated w/8 3/4" holes.
Neenah Foundry Co. Series R-4055 or equal.



Notes:

Where the main line is located in a street or road, the air release valve and box are to be located off the road where not subject to vehicle traffic, and connected to the main by 1" piping.

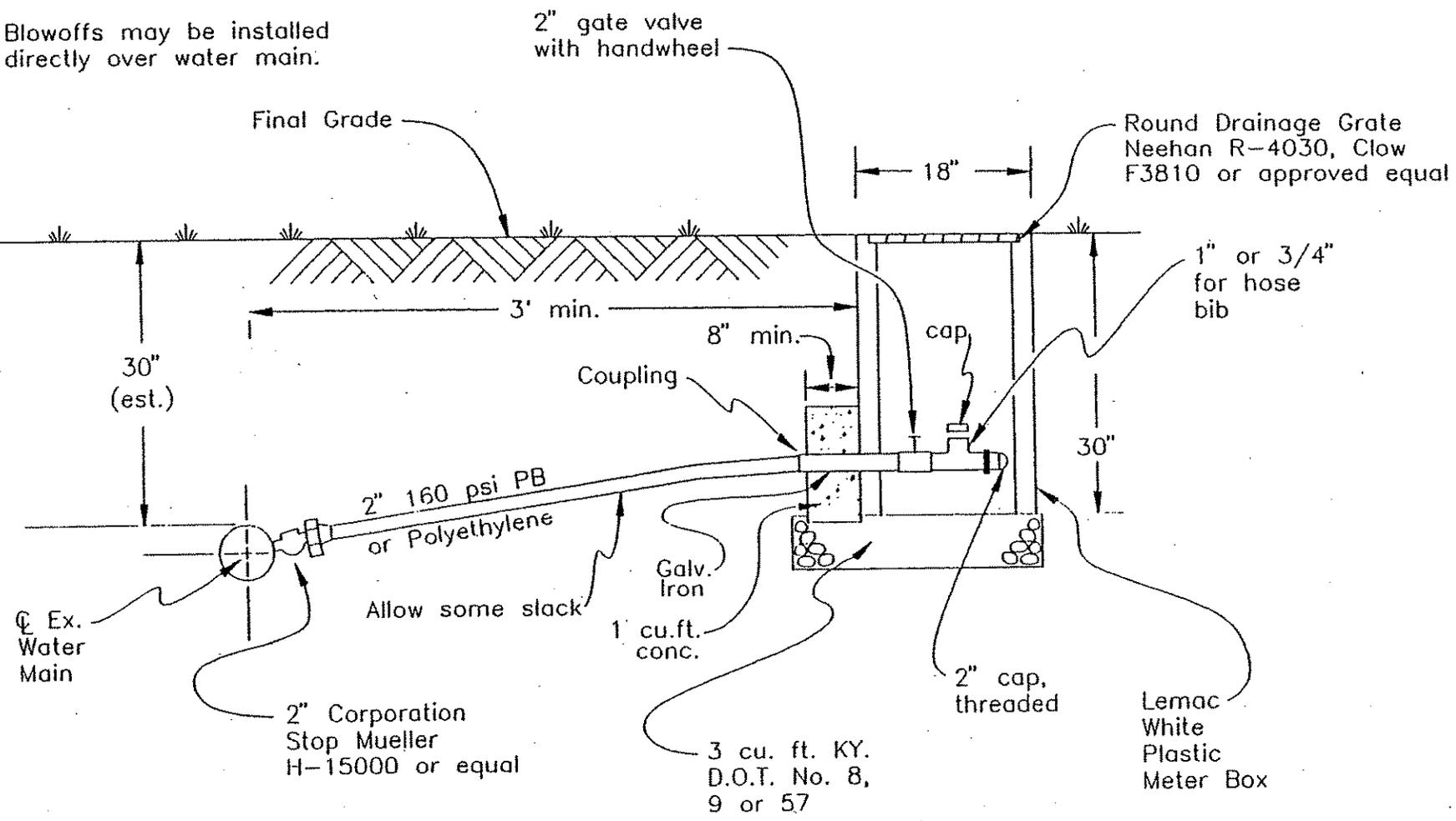
* Standard meter box may be used at location not subject to vehicular traffic.

AIR VALVE SETTING (WATER MAINS)

NOT TO SCALE

Std. Drawing No. WL 203

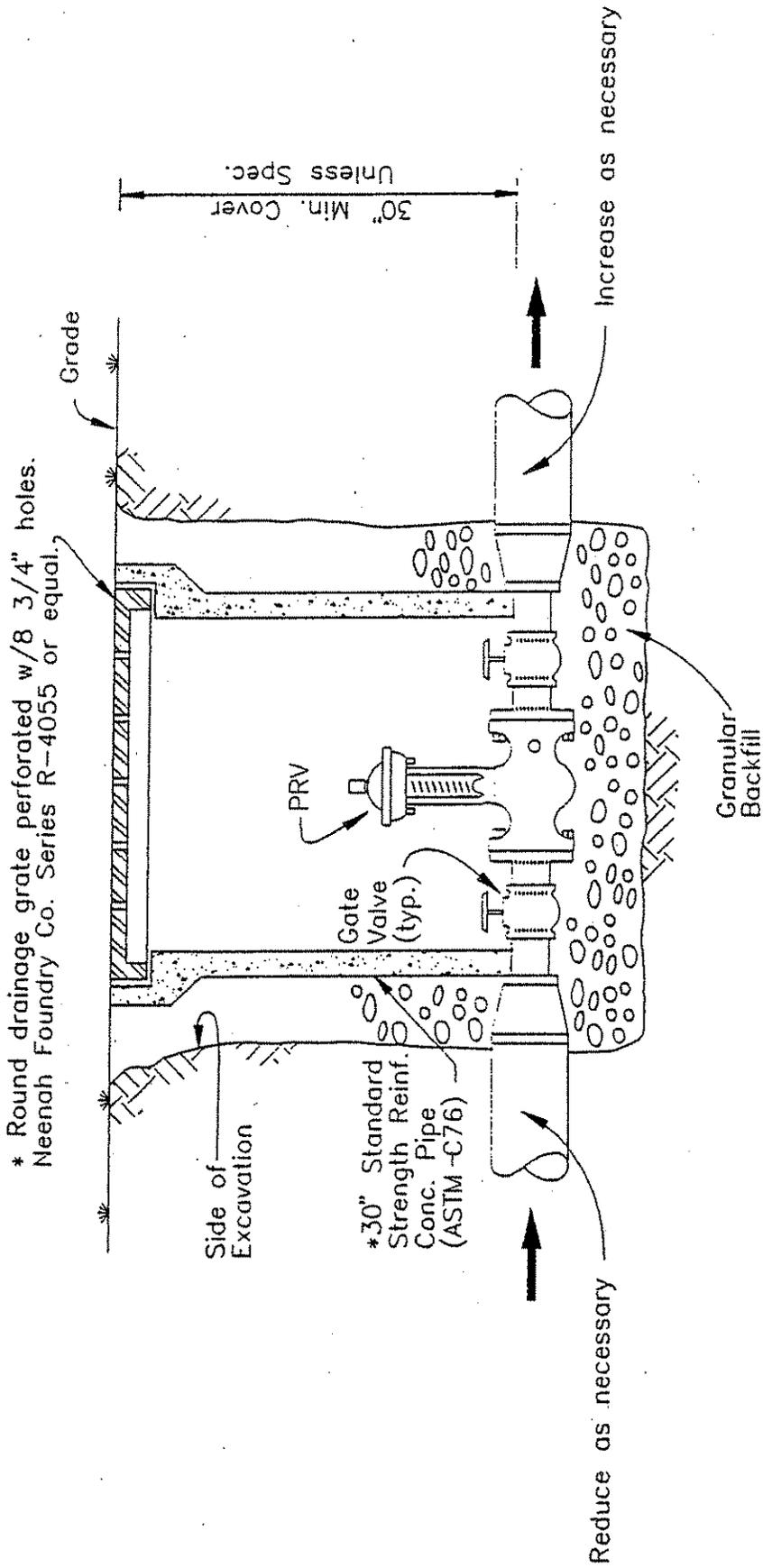
NOTE: Blowoffs may be installed directly over water main.



CASE 1: 4" to 10" PVC or AC
Use Corp. Stop & Tap Saddle

CASE 2: 2" to 3" PVC or AC
Use PVC molded fitting (tee) with direct coupling to plastic pipe and adapter to AC pipe

BLOWOFF	
NOT TO SCALE	Std. Drawing No. WI. 204



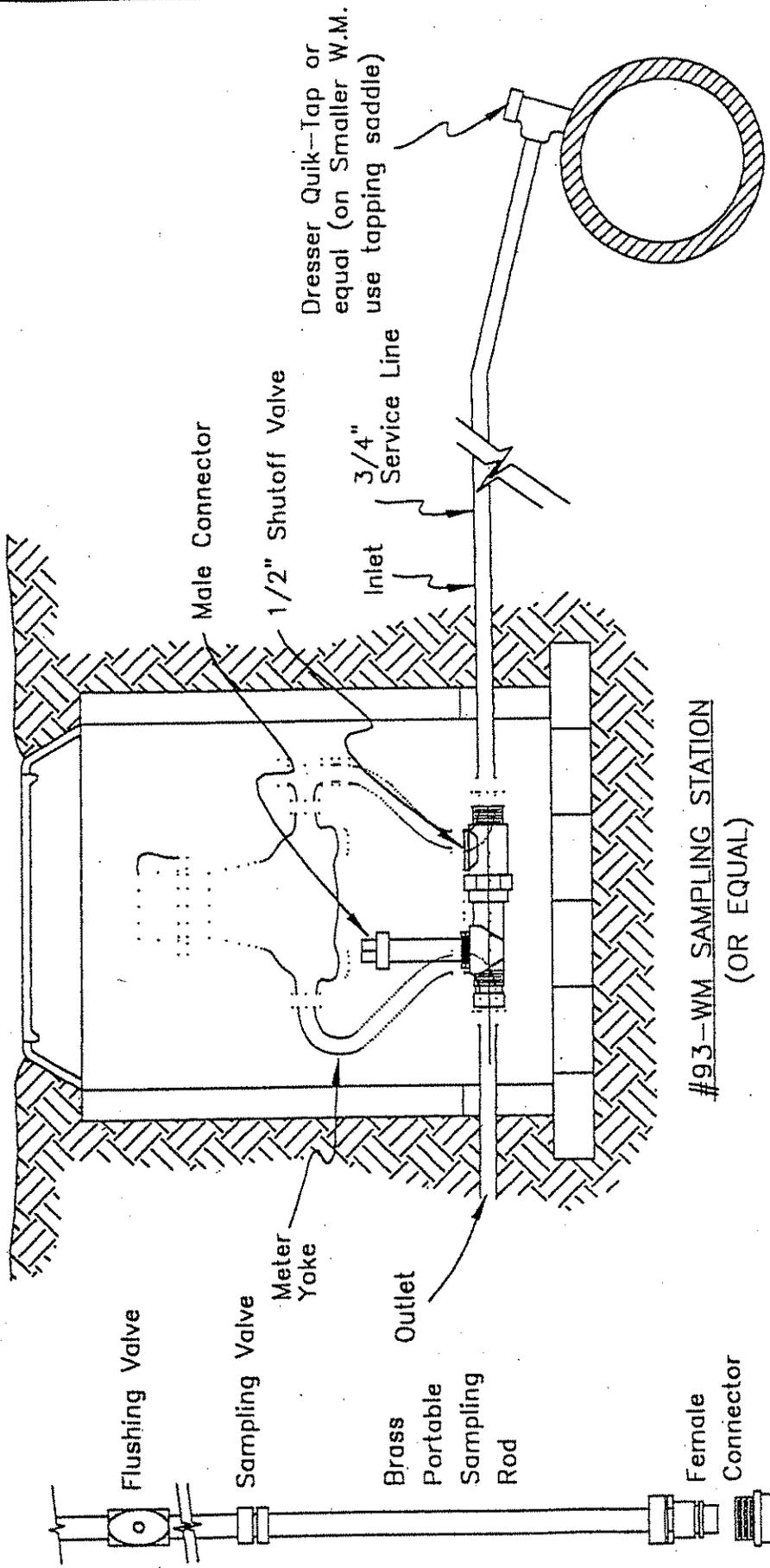
Note:-

* Standard meter box may be used at location not subject to vehicular traffic.

PRESSURE REGULATING VALVE (PRV) ASSEMBLY

NOT TO SCALE

Std. Drawing No. WL 205



#93-WM SAMPLING STATION
(OR EQUAL)

PORTABLE SAMPLING ROD

NOTE:
Can be used in conjunction with existing Water Meter.

SAMPLE STATION



CONTRACT VIII
300,000 GALLON ELEVATED TANK
DELISLE CURVE WATER PROJECT
BRACKEN COUNTY WATER DISTRICT
BRACKEN COUNTY, KENTUCKY
JANUARY 2006

Proposal of _____ (hereinafter called "BIDDER"),
organized and existing under the laws of the State of _____ doing business as
_____. * To the _____
_____ (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all work for the construction of Bracken County Water District, Delisle Curve Water Project (Contract VIII) in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

By submission of this bid, each BIDDER certifies, and in the case of a joint bid each party thereto certifies as to its own organization, that this bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence work under this contract on or before a date to be specified in the Notice to Proceed and to fully complete the project within 270 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$500.00 for each consecutive calendar day that the work remains incomplete after the expiration date of the contract.

BIDDER acknowledges receipt of the following Addenda:

Addendum No. _____ Addendum No. _____ Addendum No. _____

The BIDDER hereby proposes to furnish and do all that is required by the contract to which this refers for the construction of all structures listed at the prices shown for each bid item on the following Bid Schedule. (The Bid Schedule attached lists the various divisions of construction contemplated in the Plans and Specifications, together with an estimate of the units of each. With these units as the basis, the BIDDER will extend each item, using the cost he inserts in the unit column. Any total cost found inconsistent with the unit cost when the bids are examined will be deemed in error and corrected to agree with the unit cost which shall be considered correct).

*Insert "a corporation", "a partnership", or "an individual" as applicable.

The undersigned BIDDER does hereby declare and stipulate that this proposal is made in pursuance of and subject to all terms and conditions of the Instructions to Bidders, the Construction Contract, the Technical Specifications, and the Plans pertaining to the work to be done, all of which have been examined by the undersigned.

Accompanying this proposal is a certified check or standard bid bond (5% of the Total Bid) in the sum of _____ dollars and _____ cents (\$ _____) in accordance with the Instructions to Bidders.

The undersigned BIDDER agrees to execute the contract and Performance and Payment Bond for the amount of the total of this bid within 10 calendar days from the date when the written Notice of Award of the contract is delivered to him at the address given in this proposal. The name and address of the corporate surety with which the BIDDER proposes to furnish the specified Performance and Payment Bond is as follows:

All the various phases of work enumerated in the Technical Specifications with their individual jobs and overhead, whether specifically mentioned, included by implication or appurtenant thereto, are to be performed by the Contractor under one of the items listed in the Bid Schedule, irrespective of whether it is named in said list.

Payment for work performed will be in accordance with the Bid Schedule, subject to changes as provided for the Construction Contract.

The BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informalities in the bidding.

The BIDDER agrees that this bid shall be good and may not be withdrawn for a period of 90 calendar days after the scheduled closing time for receiving bids.

Bids shall include sales tax and all other applicable taxes and fees.

BID SCHEDULE

<u>Item</u> <u>No.</u>	<u>Item</u>	<u>Unit</u>	<u>Total</u>
1.	300,000 Gallon Elevated Water Storage Tank, including tank, tank foundation, valve vault, piping, site preparation, excavation, access road and all appurtenances, as shown on the Plans and Specifications, complete in place.	L.S.	_____
2.	Tank Containment During Surface Preparation and Painting, including all materials and labor.	L.S.	_____

The total sum of Items 1 and 2 bid shall be written both in words and numerically. In case of a discrepancy, amount shown in words will govern. THE BIDDER'S TOTAL SUM BID FOR ITEMS 1 AND 2 IS:

_____ DOLLARS AND
_____ CENTS (\$ _____)

The above prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for complete in place.

(Contractor) (Date)

By _____

(Title)

(Business Address)

(Phone Number)

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____

_____ as Principal, and _____

_____ as Surety, are hereby held and firmly bound unto _____

_____ as OWNER in the penal sum

of _____ for the payment of which, well

and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this ____ day of _____, 20 ____.

The Condition of the above obligation is such that whereas the Principal has submitted to _____

_____ a certain BID, attached hereto and hereby made a part hereof to enter into a contract in

writing, for the _____

NOW, THEREFORE,

- a. If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attachment hereto (properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor, furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall

remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

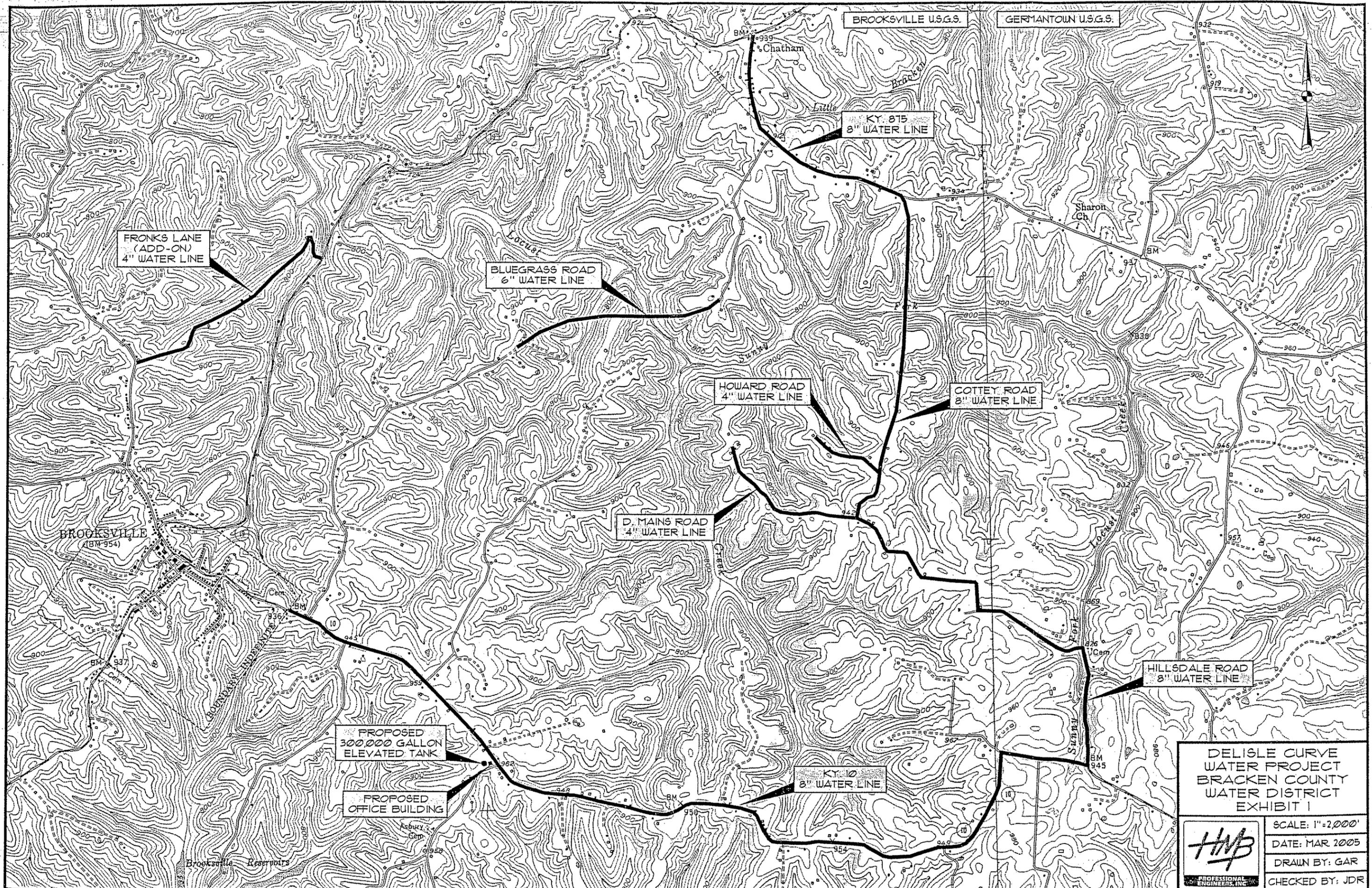
_____(L.S.)
Principal

Surety

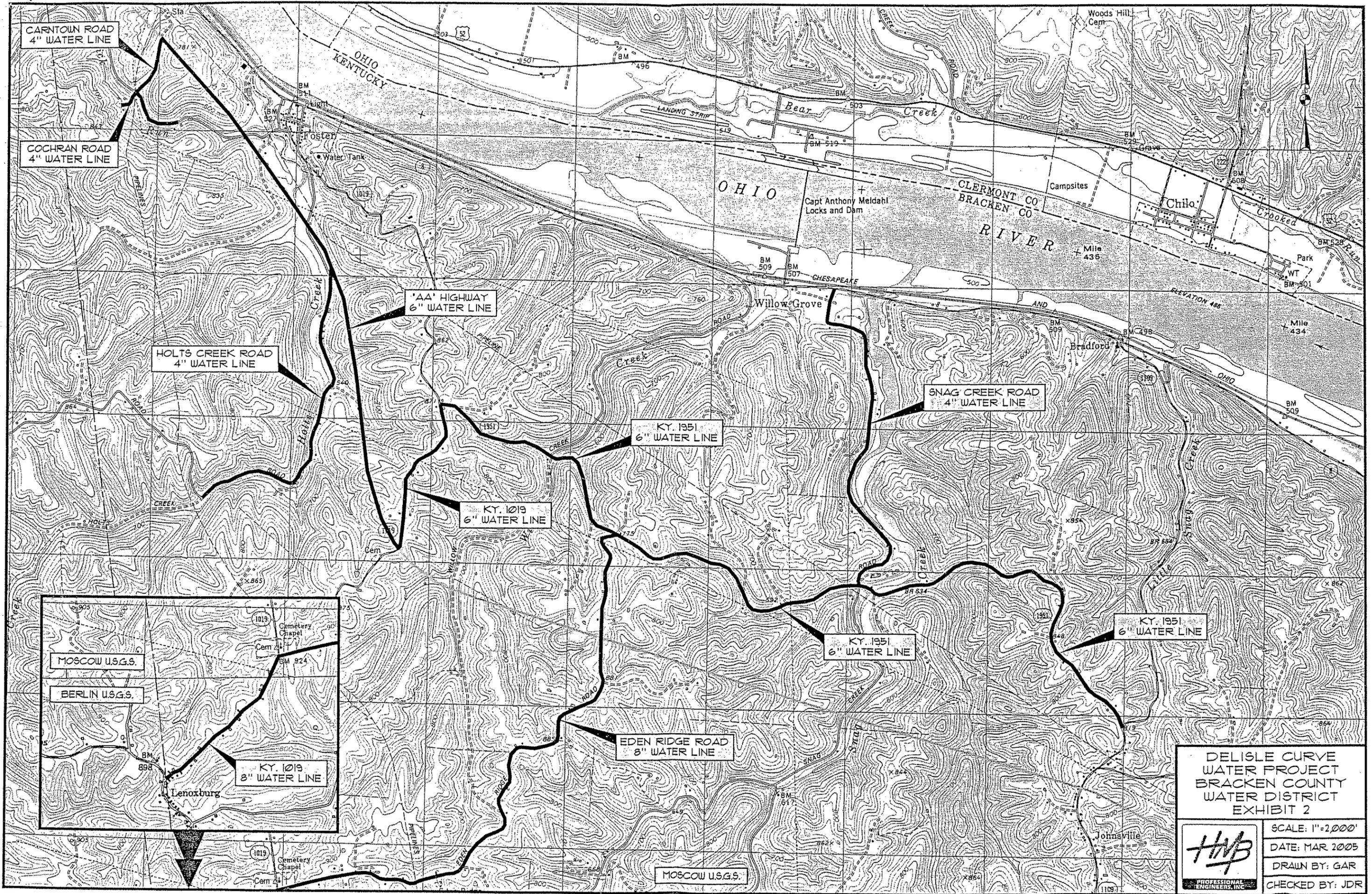
By: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.





DELISLE CURVE WATER PROJECT BRACKEN COUNTY WATER DISTRICT EXHIBIT 1	
	SCALE: 1"=2,000'
	DATE: MAR 2005
	DRAWN BY: GAR
CHECKED BY: JDR	



**DELISLE CURVE
WATER PROJECT
BRACKEN COUNTY
WATER DISTRICT
EXHIBIT 2**

HMB
PROFESSIONAL
ENGINEERS, INC.

SCALE: 1"=2,000'
DATE: MAR 2005
DRAWN BY: GAR
CHECKED BY: JDR

DELISLE CURVE WATER PROJECT BRACKEN COUNTY WATER DISTRICT BRACKEN COUNTY, KENTUCKY

CONTRACT VII

RECEIVED

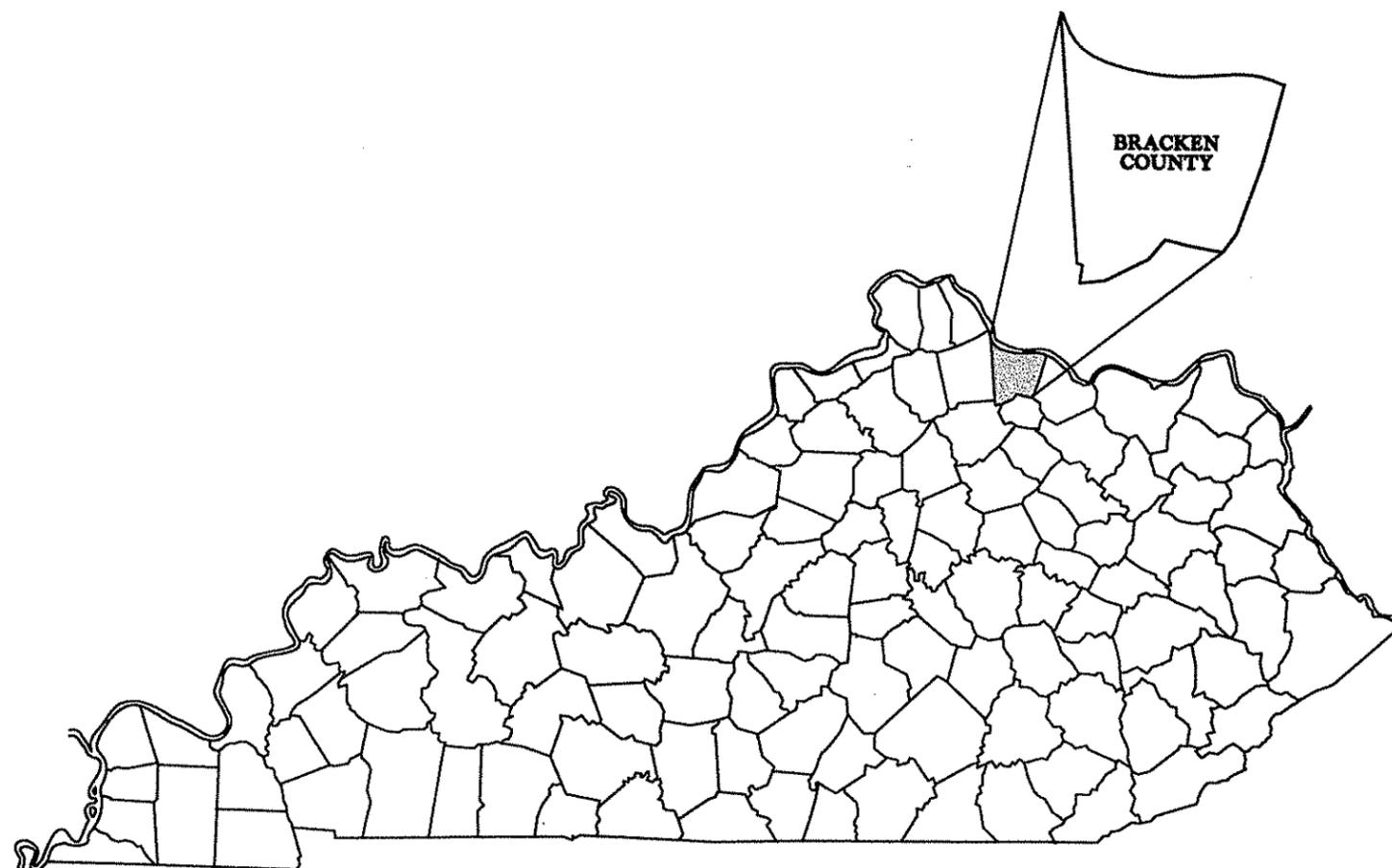
[Handwritten signature]

PUBLIC SERVICE
COMMISSION

RECEIVED

FEB - 7 2006

PUBLIC SERVICE
COMMISSION



[Handwritten signature]
JEFF D. REYNOLDS
KENTUCKY P.E. #20469

STATE OF KENTUCKY
JEFF D. REYNOLDS
20469
LICENSED PROFESSIONAL ENGINEER

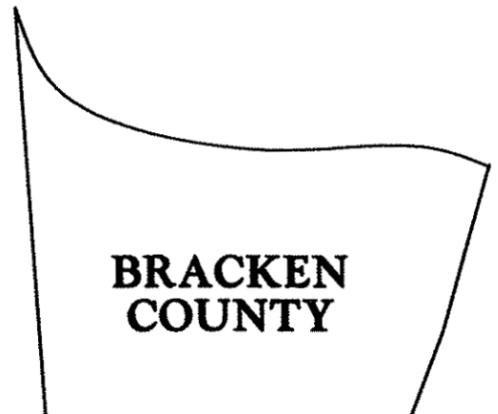
JANUARY 2006

Plans Prepared By:



3 HMB CIRCLE
FRANKFORT, KENTUCKY
(502) 635-3800
(502) 635-3810 FAX

**WATER DISTRICT
WATER PROJECT
AN ELEVATED
RAGE TANK
CT VIII**



RECEIVED

FEB - 7 2006

PUBLIC SERVICE
COMMISSION